MODEL AIRPLANE NEWS

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SEMI-SCALE STUNT WINNER

Pg. 11

By BILL WINTER

FOR the past year American modelers have been hearing about F.A.I. records and record attempts. After so many years of intensive developments of our own rules, which inevitably trend toward removing all obstacles, even inconveniences to the builder, F.A.I. requirements seem fantastic and the models themselves freaks.

In our model world, the F.A.I. rules have the theoretical value of Esperanto in that all of us supposedly should compete on a standardized basis, with our world's records being world's records made against the best that foreign lands have to offer. Actually, the F.A.I. rules are, from our point of view, a very goofy business, hardly worth the very heavy fee the Academy pays yearly for its franchise. As far as we know the rules have not even been made available through our magazines. The occasional tidbits of info that someone tried a speed free flight at Detroit, or that a Navy *Avenger* lost a free flight on an altitude attempt at Dallas, certainly isn't going to sell us on the F.A.I. Too many of the rules sound as if they were carried over from the days when we measured flight distances with a wheel and meter.

It isn't standardized rules that have made for international competition and interesting events. In Europe a number of special cups and trophies having their own rules are keenly competed for. One of these—and what started America competing in this particular event—is the Wakefield, whose requirements are so world famous that a fellow from Finland can win with a ten-year-old ship. There are others just as worthy, such as the Bowden precision gas event in Great Britain which always produces a bevy of novel gassies.

From Henry Dore, Louisville, Kentucky, the "*Scrap Box*" for the first time heard of a famous French competition, the Coup d'Hiver, organized nine years ago by the French Magazine, MODELE REDUIT D'AVION. Dore and his side kick, Claude Curry, entered this year's Coup d'Hiver, held February 5 in Paris, by proxy. His account is so interesting that we are going to let Henry take over for a few "paragiraffes."

"In nine years," begins Dore, "the Coup d'Hiver has grown into one of the leading meets in Europe. This year there were 134 contestants. Originally, the rules called for ships similar to the Wakefield but, during the war, it became practically impossible to build such models due to the lack of balsa and rubber in Europe. The rules were then changed so as to limit the weight of the motor to 15 grams, yet the total weight of the airplane was kept high (a minimum of 80 grams), to keep performance down and prevent loss of too many models.

"The formula became very popular in France during the war," continues Dore, "and, in fact, the Coup d'Hiver was about the only rubber-powered meet of any importance during the Occupation years. Another factor to the Coup d'Hiver's great success was its place on the model calendar. It is always held in February and helps to stimulate model activity during the normally dull winter months. Also, once a date is set it is never postponed, regardless of weather. This makes it a very difficult meet but adds to the fun. In 1947 it was held in snow. This year it rained.

"After the war when supplies became available it would have seemed logical to go back to the old pre-war rules, but the temporary rules had become so popular that they continued in force. In fact, the organizers of the meet went a step further and reduced the maximum weight of the motor to 10 grams, still maintaining the minimum total weight of 80 grams."

After five Coup d'Hiver models, Dore and Curry found them a great deal of fun to build and fly. Their ships, ideal sport models by the way, had about 120 sq. in. of wing area. The 10-gram motor was in the form of 10 strands of 3/16" rubber, 12" long, turning a proper of 12" dia., with a pitch/diameter ratio of 1.5. This combination afforded an average of between 1 min. and 1 min., 10 sec. A good Wakefield, states Dore, should do 3 to 3½ min. with a power/weight ratio of ½. A Coup d'Hiver model with a power ratio of ⅛ will easily do 1 min.! How did our chaps do, did you say?

(*Turn to page 34*)

A group of novice stunters who are learning the game from Howard Anderson and scale man Grant Jeffers. All are members of the *Austin Aeronuts*, Austin, Minn.

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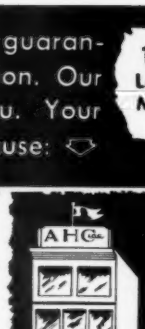

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⅛"—25c; 1⅛"—30c; 2" ..... .35
2¼"—1.00; 2¾" 1.25
3" Needle Nose 1¾" dia. 1.15
2" 1.20
Plastic 1¼" ..... .50
Scamper Plastic 1¾"; 1⅞"; 2", 2¼" ..... .45
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Hilford Pneumatic (pr) 2" .. .85
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Sponge Rubber, Dural hub (pr)
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Tail Wheels ⅞"—10c; 1⅛" ... .15
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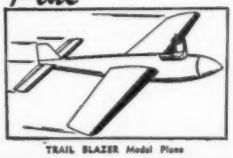

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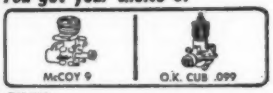

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NAVY AIRCRAFT procurement program for the 1950 fiscal year (July 1, 1949 to June 30, 1950) has been revealed and blue ribbon honors go to Grumman for their superfast, superhard-hitting F9F *Panther* jet fighter. Navy has ordered 242 *Panthers* in two versions, bringing to more than 450 the total awards to this sleek fighter. Navy will get the F9F-4, powered by a new and more powerful version of the Allison J33 used in the F9F-3, and the F9F-5, powered by the new Pratt & Whitney J48 turbo-jet which is the Rolls-Royce *Tay* engine built under license. The *Tay*, in turn, is an improved version of the famed Rolls-Royce *Nene* engine, used in many British jet planes and also built by Pratt & Whitney as the J42, used in the Grumman F9F-2 *Panther*.

SECOND BIGGEST Navy order went also to a fighter, the now well-known and reliable McDonnell F2H-2 *Banshee*, famed for its terrific rate-of-climb and ceiling of well above 50,000'. Navy has ordered 140 of the type, which will keep McDonnell's production lines busy for another year. Another fighter, the two-man Douglas F3D *Skynight*, came in for an order for 70, bringing to 100 the total of these all-weather fighters on order. That means that our carrier fighter groups in the coming year will have the *Panther* as a rapid-fire, hard-hitting interceptor, the *Banshee* as a long-range escort and the *Skynight* as the all-weather operator, which we would say was quite a team. Navy had prepared an order for 90 Vought F7U *Cutlass* tailless fighters but withheld it at the last minute. It may be that this order will be awarded at a later date after the outcome of some last-minute price determination and performance estimates with improved power plants and long-range tanks, but as of now only the original 19 are on order.

BUT THESE fighters are only the beginning in the really high-performance bracket, for Navy is getting ready to test a trio of honestly super-performers this coming year. The Douglas XF4D-1, McDonnell XF3H-1 and Grumman XF1OF-1 are well under construction and the last-named is just about the hottest combat airplane now on the horizon: supersonic! Sorry there's no more details we can publish at this time but here's just an indication that the Navy isn't "sunk" yet—not by a long shot!

IN THE OTHER categories of production, the Navy stuck pretty well to the old reliables, such as an order for 53 more Douglas AD *Skyraiders* and 45 more Lockheed P2V *Neptunes*. The North American AJ order was extended by 15 more airplanes and Navy added 72 to the existing order for Grumman AF *Guardians*. This last order is made up of 36 AF-2W search planes and 36 AF-2S anti-submarine planes, which boiled down out of their technical jargon means 36 "hunter-killer" teams. The AF-2W carries heavy radar gear and searches out the enemy submarine, while the AF-2S carries heavy depth charges and bombs and polishes off the sub found by its mate. It's a terrific new combination in the air paralleling the surface "hunter-killer" teams. It also solves the problem of building an airplane that can carry all the radar equipment plus all the bombs required by dividing the job up between two versions of the same airplane: one carries the radar, the other the bombs!

BIGGEST NEWS of the month in the commercial field is that the United States is finally going to get its gas turbine airliner! After one of the biggest hullabaloos heard in many years in aviation, resulting from our discovery that the British were way out in front in the gas turbine airliner picture, the U.S. is taking its first step in this direction: a Convair Liner powered by Allison turboprops. But, believe-it-or-not, it's the engine company that's buying the airplane! Yes, this reverse order of business resulted from the continued bickering over whether or not the government was going to subsidize the construction of a "prototype" gas turbine airliner, whether any airframe company was going to order turboprop or turbo-jet engines for experimental installation, etc. Allison Division of General Motors finally got tired waiting and bought a *Convair Liner* in which they will install their exciting new T38 turboprop engine, developing 2,750 hp, and new three-blade Aeroproducts Division (also General Motors) propellers. Of course, Allison isn't going to build any turboprop airliners but it hopes that a nation-wide demonstration of the improved performance in a standard airliner through installation of its new T38 turboprop engine will bring in a flock of engine orders. Allison is also

offering the T40, which is two T38's hooked together to produce 5,500 hp but that's a whale of a pull for any airplane. The big Boeing *Stratocruiser* could use it, of course, in place of its four 3,000 hp Pratt & Whitney *Wasp Majors*, as could the Douglas C-124 *Globemaster II*. Lockheed could place two T40 units in the inner pair of engines and two T38 in the outer pair on the *Constellation*. Allison believes that the solution is to convert existing airliners to turboprop power, since apparently nobody is flush enough to turn out a brand-new turboprop airliner. But at least the first step has been taken towards putting the U.S. in the international race—and without any government hand-outs either!

YOU PROBABLY remember the ill-fated McDonnell XF-85 "parasite fighter" idea in which the tiny craft was stowed inside the bomb bay of the huge Convair B-36 bomber, enabling it to carry its own fighter escort with it to Moscow. Well, that idea didn't work out and the Air Force gave up on the XF-85 arrangement. But they didn't give up on the idea for now they are getting ready to mount two Republic F-84 *Thunderjet* fighters under the wing of the B-36, or the Boeing B-50, for mid-air launching under attack. This idea is wholly practical and it solves problems the first arrangement couldn't. The XF-85 didn't work out satisfactorily because the cards were stacked against it—not because it wasn't a good airplane. Because the B-36 bomb bays are so cramped, McDonnell designers had to use folding wings, crimped-up tail surfaces, barrel-shaped fuselage and other such unconventional arrangements to cram their fighter into the small space allowed, which resulted in less-than-normal stability, extremely short duration, etc. And then, too, test pilot Ed Schoch had a terrible time "threading the needle" in engaging the hook of the B-36 for retrieving. Well, the use of the full size, standard layout, long-range Republic F-84 solves all of those problems except the last one and the Air Force is simply abandoning the idea of retrieving the planes after the battle. The F-84 will be mounted under each wingtip of the B-36 and B-50 and will be cut loose over the target. After the fight, the F-84 will be on its own, of course, but Air Force won't cut it loose out of safe range of friendly territory and the F-84 can fly for 2,000 mi.!

A FUTURE production winner in the Air Force sweepstakes is the new North American YF-93A, a development of the world's fastest combat airplane, the F-86A *Sabre*, but featuring many characteristics of its own. The F-93 is powered by the Pratt & Whitney J48 turbo-jet engine, previously described, and with its afterburner in operation it develops 8,000 lbs. of thrust! The F-93 is a single-seat all-weather design, a type the Air Force hopes eventually will obsolete the two-man all-weather design. Secret of the F-93's supersonic performance is its flush air inlets, developed by the NACA to take aboard all the air required for the engine without the cost in drag of conventional scoops. The purpose of the regular scoop is to slow the incoming air down while it picks up pressure. The NACA flush air inlet does this by a diverging ramp, which expands in two directions at once yet doesn't project out of the smooth lines of the fuselage. Air Force is readying a production order for the all-weather, flush-scooped F-93 as soon as its test flights at Edwards Air Force Base, Muroc, Calif. are completed.

AMERICAN AIRLINES has signed a purchase order with Douglas Aircraft for 11 DC-6B transports, bringing to 17 the total now on order. United Air Lines previously bought 6 of the new type. The DC-6B is a development of the standard DC-6 with 5' of additional fuselage length and more powerful engines, giving it both more space and more performance. The DC-6A is an all-cargo version while the DC-6B is the 52-passenger version. The DC-6B is powered by four Pratt & Whitney R-2800-CB16 engines with water injection equipment giving 2,400 hp each for take-off. So it looks like the airlines are pretty satisfied with old-fashioned piston-engined transports after all, in spite of the mighty cry for jet transports heard in recent months; cries, that is, by everybody but the people whose business it is to operate them!

AIRPLANE LINEUP for British European Airways Corp. has been decided and BEAC will operate the *Ambassador*, *Viscount* and *Marathon* transports exclusively. The Airspeed *Ambassador*, of which 20 are on order, seats 49 and is a twin-engine high-wing monoplane. The Vickers *Viscount 701* is powered by four turboprop engines and will be used on medium range routes, such as London-Rome. BEAC has not decided the quantity needed but states it will be between 20 and 30. The Handley-Page *Marathon*, which was purchased from the defunct Miles Company, seats 20 and will be used on short-haul inter-city routes. A total of 14 will be delivered. Peter Masefield, BEAC Chief Executive, believes that a high-speed jet type may be required at a later date but has no plans for purchase of a jet transport for several years.

DE HAVILLAND Aircraft Co. has announced a new four-engine version of the tremendously successful D. H. *Dove* light transport. The new model, powered by four (instead of two) D. H. *Gipsy Queen 30* engines, is named the *Heron* and is designed to seat 14-17 passengers, cruise at 160 mph, have a range of 400 mi. and a ceiling of 18,500'.

ANOTHER FAMOUS personal aircraft company has gone down to defeat, this time the Luscombe Airplane Co., Dallas, Tex. (Waco Aircraft Co., one of the most famous commercial aircraft builders in the world during the 'thirties, closed its doors two years ago.) Luscombe, producers of the pre-war *Phantom* and the successful post-war line of two-seat personal aircraft, is being taken over by Texas Engineering and Manufacturing Co., but the decision as to whether or not to continue production of the Luscombe line of aircraft has not been reached. Luscombe had been in serious financial difficulty the past two years and had obtained heavy loans, which it could not repay.

NAVY HAS developed a new air-to-air rocket designed to solve the problem of firing rockets into cross-winds, such as would be required from bomber turrets. Named the *Mighty Mouse*, the new weapon has folding fins, which expand out into the slipstream only after firing. With normal fixed-fin rockets, firing them abeam would result in their trailing around into the prevailing wind, thereby making them useless for bomber turret firing but the new rockets are expected to travel up to maximum speed before the fins fold out, thereby making a straight course possible. An advantage of the new folding fin for forward firing is the fact that they can be bunched closely under the wing, instead of in widely scattered clusters, as is required with fixed-fin designs. The new missile is 3" diameter, compared to 5" in the standard HVAR and 11.5" in the *Tiny Tim* model, but their hitting power is stated to be great enough to destroy any known airplane with a direct hit.

WHILE WE are still trying to get used to the idea of a plane actually flying at supersonic speed, comes now word that the Bell X-1 research airplane has been rolled at supersonic speed! It has also been looped, spun and stalled from supersonic speed, although its speed dropped to subsonic when it went into these maneuvers. The annual report of the NACA states that the X-1 has made rudder-fixed aileron rolls at supersonic speed. Test pilot Charles Yeager is known to have stalled the X-1 at 63,000', resulting in a roll outside and a few unpleasant moments while it was brought back under control. The X-1 has been flown at 1,000 miles per hour, which means it could leave New York at noon and land in San Fracisco at noon the same day: elapsed time—zero!

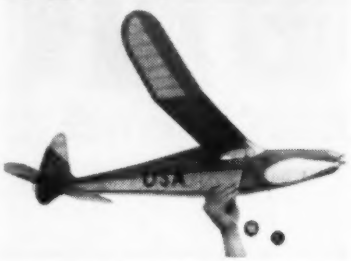
SECRETARY OF Defense Louis Johnson likes Secretary of Air Force Symington's plush Lockheed C-121 Constellation so well he has ordered one just like it! Known fondly as the *Dewdrop*, the luxurious "Connie" is used by top Defense Department executives for inspection trips to military installations.

REPORT FROM THE WEST

by Lew Mahieu

CLUBS and contests are beginning to roll on the West Coast. The big item just now seems to be the Wakefield contest of 1950. Preparations are being started sooner this year for the Wakefield Elimination Meets. The West Coast will be allowed two members on the team to go to Finland. Chicago, New York, Hampton, and the Cleveland-Akron area will be allowed one member each. The International Wakefield competition will be held July 23, 1950, in Finland. The proposed plan to pick the two West Coast members is similar to that used by New York *Prop Spinners*, which was followed as a pattern. The Coast plan includes four meets, to be held in Portland, Salt Lake City, San Francisco, and Los Angeles. From each of these four meets, six men will be sent to San Francisco for the fly-off to see who will be the two lucky boys to get the trip to Finland. The AMA, Frank Zaic and Vice President "Pop" Robbers are in favor of this idea, so there is a strong possibility it will be accepted.

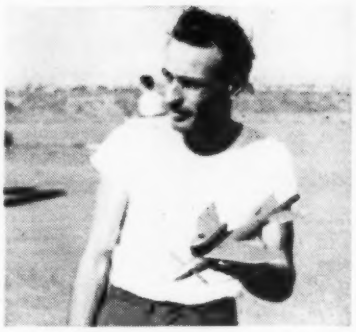
Your West Coast reporter and the *Thermal Thumbers* have had several inquiries concerning the Wakefield Team Competition conducted by the *Thermal Thumbers* last year. Yes, the *Thumbers* will conduct their Second Annual Wakefield Team Competition, May 7, at Los Angeles. The meet will again be sponsored by the *Engineers and Architects Association of Southern California*. Get together fellows, and form your team of five for this affair. In addition to the large perpetual trophy, each member of the winning team will receive an individual beautiful trophy. Teams should be formed before the day of the meet if possible. Information and entry blanks for the meet will be distributed, but if other information is needed, contact: Lo Salisbury, 2507 California Avenue, Huntington Park, Calif.



Wakefield ship by Carl Stokes, of Seattle, was too good; lost O.O.S. on 6th flight

We received an interesting letter from Jim Avis, of Seattle, Wash. Jim is one of the most active modelers in his area, his models are beautiful and can be compared with any now flying. With Jim as president of the *West Seattle Model Airplane Club*, we'll say that theirs will be the club to watch in Seattle. You might like to know that Jim draws his paycheck from the Boeing Airplane Company and is formerly from Kansas City, Mo., where he flew models and argued with C. O. Wright, Val Sherrard, Tom Wardlow, and the other Mid-West hot-rods. Jim says, "We are all very interested in the Wakefields and are building like mad. Unfortunately, we didn't know about the West Coast Eliminations last year until it was over. We have the facilities here in Seattle for the Northwest's district meet, and, along with Henry Cole, Chuck Hollinger, Hubert Entrop, and other leader members, I will be happy to direct and see that the meet is run strictly to the rules. I think that we can get a sponsor to pay the way for six boys to the West Coast Eliminations." Outlined previously was the proposed plan for the West Coast Elimination Meets. Hope AMA and other powers including Frank Zaic and "Pop" Robbers, will see the need for the fifth meet to be held in the Seattle area.

Jim goes on to tell us about Chuck Wood's new Wakefield design that features twin rudders, over-the-wing Lanzo-type cabin, retractable one-wheel gear with pop-up-stabilizer dethermalizer. Quote: On a stack of Bibles, and Carl Stokes will bear me out, I've seen the job consistently do four to five minutes in no-thermal hazy, almost foggy weather. Unquote! We hope you get a Wakefield Elimination Meet in your area, Jim.



Jerry Strawn holds his "supersonic" Class A job, powered by McCoy 19

We talked to Johnny Brodbeck after his recent trip to Chicago to attend the M.I.A. Annual Trade Show and the World Hobby Exposition. The Trade Show was held in the Sherman Hotel, and was reported to have been most successful. The World Hobby Exposition was the largest exhibit of its kind ever held; there were over three miles of exhibits under the roof of the Navy pier. During the nine days of the exhibition, 285,000 people passed through the gates to view the exhibits. We had been wondering about Johnny's brother Bill, who flew the *Sky Baby* in local Goodyear races, and asked about him. Johnny said that Bill was crop dusting in Central California, and was going to fly the *Sky Baby* in a race at Stockton, California March 19, 1950. With the addition of pants and other details, it looks like the *Sky Baby* will be all set for the race.

Another item worth mentioning in the way of big plane racing, is the return of the 500 cu. in. engine class. This class will replace the military aircraft category, so this will probably be the last year of racing for *Mustangs* and *Corsairs* at the Cleveland Air Races.

With the new AMA officers for 1950 elected, we would like to congratulate Kenneth Held for winning the post of president. Ken is a grand guy and will give the modelers what they want, as he is a modeler who likes all types of models and flying.

We got to see and talk to some of the *San Diego Aeroneers* recently. Denny Davis is working out a new free flight gas design. Denny has just returned from a vacation in Seattle. (He was working at the Bank of America in San Diego and wanted a two weeks' vacation—he got the vacation but had to quit to get it!) Like every place else, Denny tells us that in San Diego a lot of

(*Turn to page 37*)

Gene Stiles, of Alameda, receives Class A Senior Trophy at Las Vegas meet

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Now Ready!

Our new booklet, "Contest Fuel At Its Best," containing a wealth of valuable information for every user of model engine fuels is now ready for distribution. We are sorry that the problems incident to getting New Blue Blazer ready for this season's market delayed its publication and apologize to those who have had to wait for their copies. If you haven't yet requested one of these interesting fact-filled booklets, ask your dealer or write direct.

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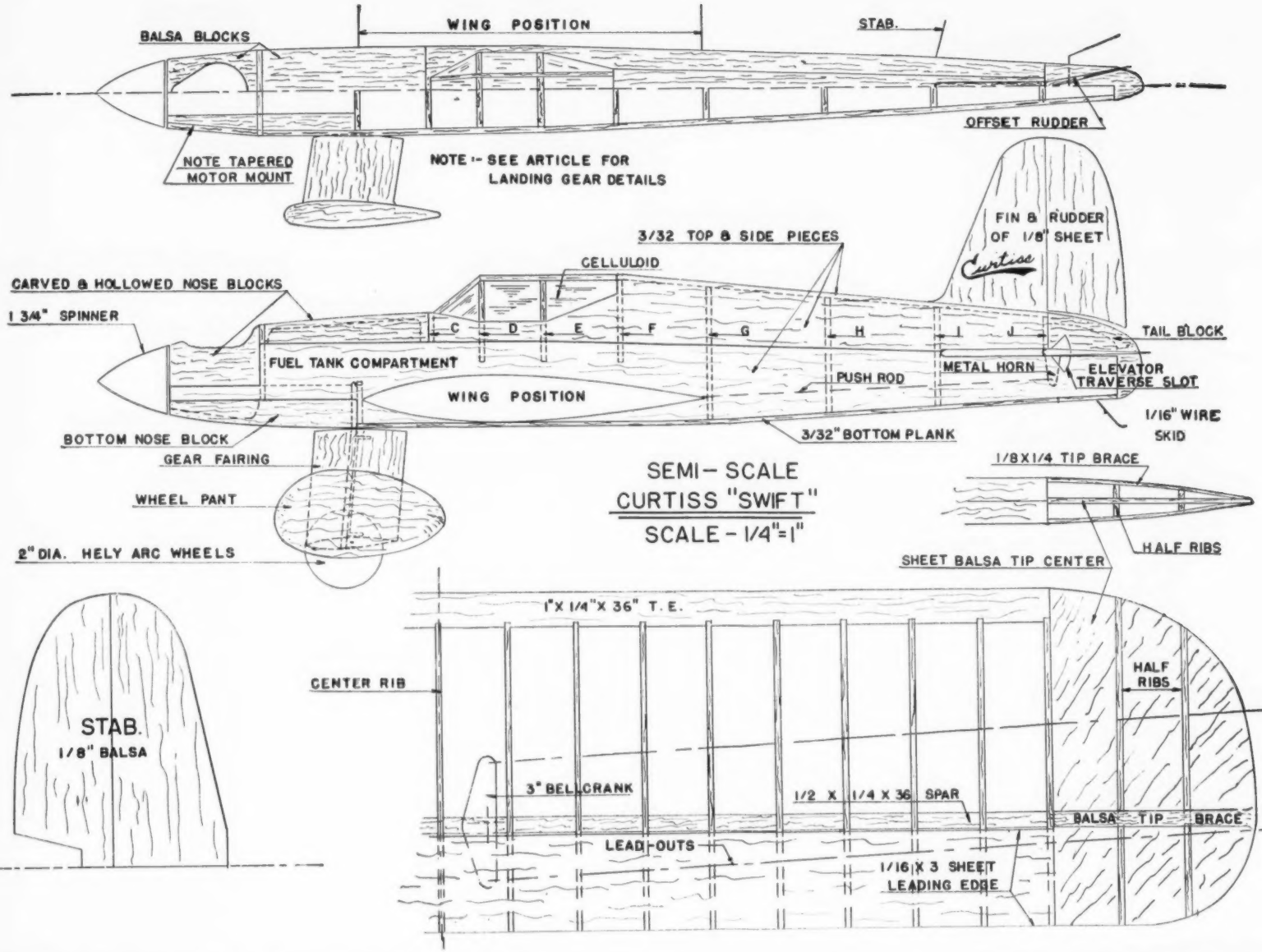
3787 GRIFFITH VIEW DRIVE • LOS ANGELES 26, CALIFORNIA


BALSA BLOCKS
WING POSITION
STAB.
OFFSET RUDDER
NOTE TAPERED MOTOR MOUNT
NOTE -- SEE ARTICLE FOR LANDING GEAR DETAILS
FIN & RUDDER OF 1/8" SHEET
3/32 TOP & SIDE PIECES
CELLULOID
CARVED & HOLLOWED NOSE BLOCKS
1 3/4" SPINNER
C
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TAIL BLOCK
FUEL TANK COMPARTMENT
WING POSITION
PUSH ROD
METAL HORN
ELEVATOR TRAVERSE SLOT
1/16" WIRE SKID
BOTTOM NOSE BLOCK
3/32" BOTTOM PLANK
GEAR FAIRING
WHEEL PANT
2" DIA. HELY ARC WHEELS
SEMI-SCALE
CURTISS "SWIFT"
SCALE - 1/4"=1"
1/8X1/4 TIP BRACE
HALF RIBS
SHEET BALSA TIP CENTER
1"X 1/4"X 36" T.E.
CENTER RIB
HALF RIBS
STAB.
1/8" BALSA
3" BELLCRANK
1/2 X 1/4 X 36 SPAR
BALSA TIP BRACE
LEAD-OUTS
1/16 X 3 SHEET LEADING EDGE

curtiss SWIFT

This prize-winning stunt ship is a welcome departure from the usual "flying barn door."

by N. H. RAMBO

AMONG U-control modelers there are those who are always striving to find the perfect stunt ship. But in trying to find this model, the various cliques of modelers have all bogged down in a rut. Either their models have no scale appearance and are good fliers, or else the planes are scaletype, but have few good flying characteristics. In my search for an ideal stunt model, I came across plans for a 1931 Curtiss Army fighter. In all aspects this plane looked like a fine subject for a semi-scale model. I knew that if I could combine this glamorous old fighter with the requirements of a good stunt ship, I would have what I desired.

My finished product was a semi-scale Curtiss *Swift* that filled the bill of a good looking, tight maneuvering, but smooth flying stunt model. Flying the *Swift*, I won the Philadelphia Flying Circus, took first in Stunt in the Pennsylvania State Championship Meet and flew to third place in Senior Precision in the 1949 Plymouth International Meet. The *Swift's* performance certainly vouches for its ability. The construction of this model is simple and clean cut. A few evenings are all that are required to construct a *Swift*.

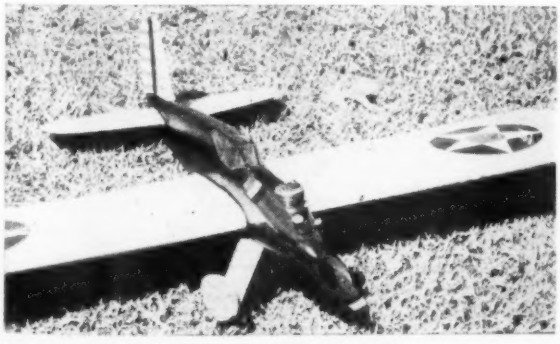
The fuselage is the best place to start. Two side pieces and the bulkheads are cut from 3/32" sheet balsa. The outline of the fuselage sides is marked with solid lines on the drawings. Cut wing slots in these two side pieces at this time. The two plywood formers are best cut with a saw, and preferably, a jig saw. Good hard pine or mahogany may be used for the ⅜" x ⅜" x 6" motor mounts. These should be tapered at the nose end as shown on the plans. Each of the two mounts should be cemented into its proper position on a side sheet. When the mounts are dry, slip the bulkheads into their proper positions between the two sides and bind the assembly with string or rubber bands until dry. This leaves a two-sided fuselage box. Next cement a bottom nose block in place and add the 3/32" bottom plank which extends from the end of the nose block to the tail. It is a good idea to add a tail skid along with the bottom plank. Sew a properly bent 1/16" piece of wire to a piece of plywood, then cement this assembly in place at the rear of the fuselage to form a durable and simple skid.

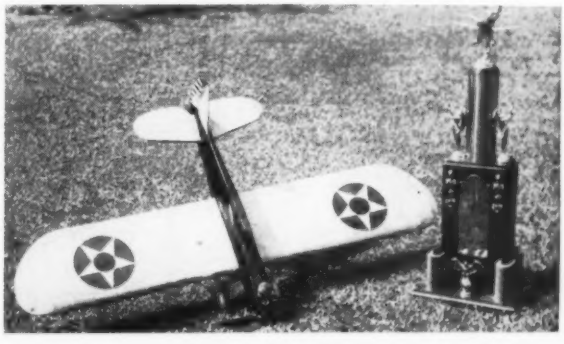
Before going further, cut out the stabilizer and elevator of ⅛" sheet. Join the two with cloth hinges and put a small metal or plywood horn at the center of the "split" elevator. This unit may be cemented in place on the fuselage box. The rudder, cut from ⅛" hard balsa, should sit on the stabilizer and be well gusseted with cement for strength. Cut away the fuselage and rudder so that the elevator can move properly. Be sure the elevator is free to move about 40° up and down.

Before completing the fuselage structure, the landing gear and wing must be added. The landing gear is mounted in an unusual manner in the *Swift*. First, drill two holes vertically through the motor bearers just ahead of the rear plywood bulkhead. Bend the landing gear wire to form a squared-off "U," and be sure the distance across the base of the "U" is the distance between the holes in the motor mounts. Drive the legs of the "U" down through the holes in the mounts. This will leave two straight pieces of wire sticking vertically through the bottom of the fuselage. Bend these to form the completed landing gear. The gear may be bound to the rear plywood bulkhead for added strength but this is not altogether necessary.

The wing is simple to build since it is not necessary to splice any spars or sheet wood to get the large span. It consists of a regular 36" symmetrically-cambered frame with large balsa tips added. To start, cut 19 main ribs, preferably in stacks on a power saw, for uniformity. Place these ribs down the main spar at two-inch intervals. Add a slotted trailing edge and leading edge planking. The wing is then ready for the tips. Cut ⅛" sheet balsa to the outline of the wing from the last main rib outward. One of these sheet outlines is butt glued to each end rib of the wing main section. Be sure to center these tip outlines on the ribs. Then cut out eight half ribs (four of each shape) and cement them in place on each side of the two-tip outlines, giving the tips the desired airfoil. It is advisable to plank the leading edge of these tips for strength or put stiffeners along the surface as shown on the plans.

Before sliding the wing into position in the fuselage, add a three-inch bellcrank. Its pivot should go through the main spar at the center section where shown. The spar must be strengthened at this point by adding plywood gussets on each side where the pivot bolt goes through. Add wire leadouts from the bellcrank through





the wingtips. To the outboard wingtip, add about 1 oz. of weight to keep that wing down in flight.

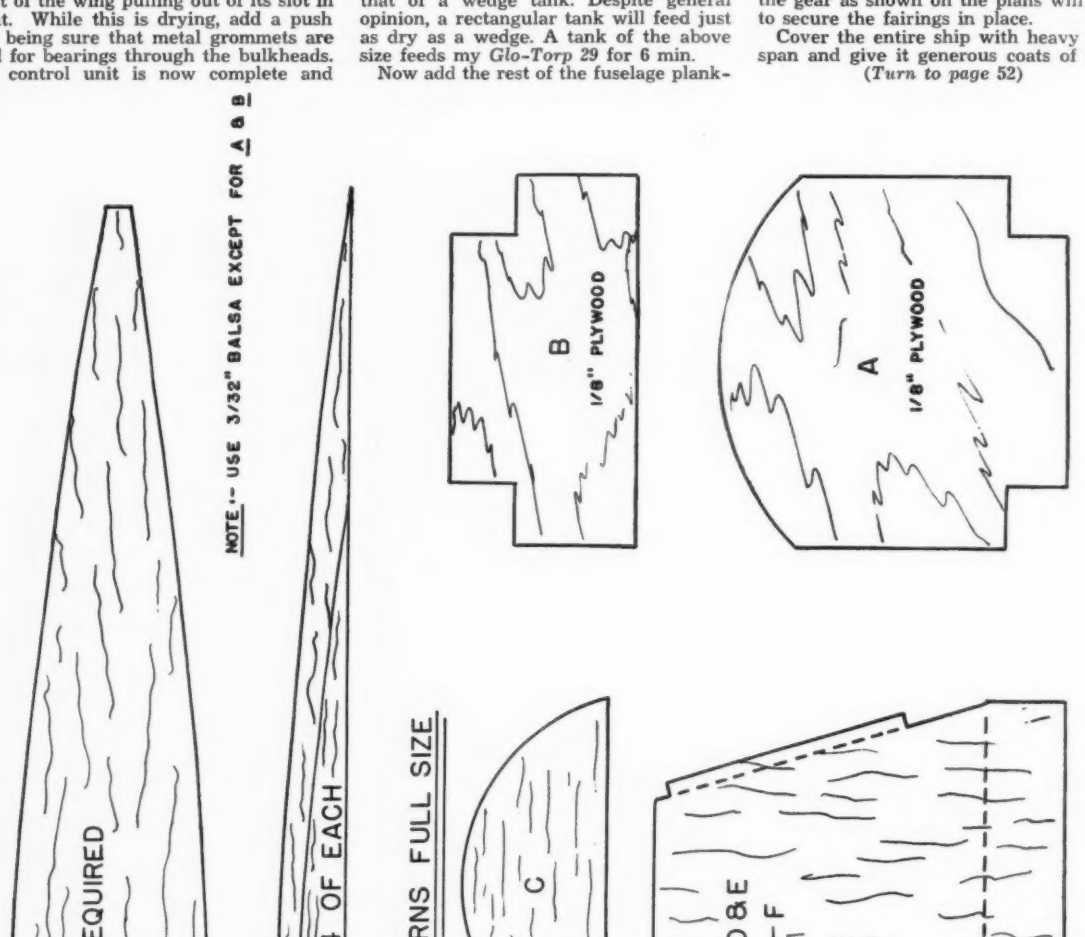
The next step is to slide the built-up wing into position in the fuselage. Cement all joints liberally to avoid the embarrassment of the wing pulling out of its slot in flight. While this is drying, add a push rod, being sure that metal grommets are used for bearings through the bulkheads. The control unit is now complete and should react freely and give equal up and down movement.

Before adding the rest of the fuselage planking, make a fuel tank (3½" x 1½" x 1") of tin can or brass material. Make a vent and fuel take-off system similar to that of a wedge tank. Despite general opinion, a rectangular tank will feed just as dry as a wedge. A tank of the above size feeds my *Glo-Torp* 29 for 6 min.

Now add the rest of the fuselage planking and nose blocks. Make the landing gear fairings and pants from scrap balsa. Put these in place after the wheels are soldered on. Be sure to bind the fairings to the wire gear, but do not cement them to the fuselage. A brace-wire soldered to the gear as shown on the plans will help to secure the fairings in place.

Cover the entire ship with heavy silkspan and give it generous coats of clear

(*Turn to page* 52)



design forum

by CHARLES H. GRANT

MANY clever but inexperienced young men have recently become interested in model flying and now are struggling with the fundamental, but baffling, problems of design. Attempts to lay out the proportions of even an extremely simple plane end in utter confusion. Invariably these fans of today are led astray by the same basic and critical design problems as were model builders of thirty and forty years ago —that is, determining the *correct area* of the stabilizer for any particular *tractor* model.

We wish to tell you a little story that will show both beginners and experts the functional significance of the tractor stabilizer. This true adventure took place in Dayton, Ohio, in July, 1919. At that time hundreds of builders were flying models but not *tractor* models. The universal model airplane was the Canard Pusher; two wings laced to a frame with two propellers at the rear.

The "adventurer" in our little story, if he may be so-called by reason of venturing into untrod fields of design, had just been released from the Technical Research Division of the Army Air Corps. Forced to make a living, he turned to models. After hours of careful designing and experimenting, bolstered by ten years of previous model designing experience, a very neat looking tractor biplane was produced. Like most tractor models of that day this plane was patterned according to *full scale* design in respect to its proportions. The stabilizer was not more than 20% of the wing area (broken line A, Fig. 1). Then, this fact did not appear to be significant, but tests showed that to have such a model fly at all, very precise and careful adjustments were necessary and the angle-of-climb had to be kept at a minimum if stalling was not to result.

However, by means of a few fine but lucky flights and a little salesmanship, our young designer sold the idea of marketing this model and other similar ones to a Dayton manufacturer. A fortunate flying demonstration from very precise adjustment, clinched a good contract for royalties and salary. Work to produce these models began immediately. Jigs and fixtures were built for production and assembly and soon parts were rolling out for 500 models a day. Finally, with a little trepidation, the first model was assembled from machine-made parts. A few "hand touches" here and there and it was ready for test flights.

But this was only the *beginning*. It is one thing to fly a carefully constructed handmade model and another thing to create and fly a model produced quickly by machines, where production methods must substitute for the careful touch of the craftsman. The first disappointment was the weight of the model —it was nearly 50% heavier than the handmade sample. However, the addition of a few more rubber strands would make it flyable, that is, provided that it proved to have sufficient stability to keep on a normal flight path. This was the second disappointment. When it was launched across a near-by field, it persistently stalled and nosed in. All knowledge gained through previous years of experimenting was focused on this problem. The plane faithfully followed full scale designs that flew well, so what was the trouble? Why do full scale airplanes of a particular design fly well while small models of the same design do not?

This question unwittingly started our young designer on the right train of thought. There is something different about a model other than scale effect—a characteristic that does not have a visual measurement. He reasoned that in a full scale airplane, the pilot makes longitudinal correction by movement of the elevators which *adds or subtracts* lift from the stabilizer, as and when he desires. On a model the stabilizer is fixed and any change in the lift force or "downward" force on the *model* stabilizer must be the result of a change in the attitude of a model in flight; actually a change in the angle-of-attack. This takes place also on the full scale airplane but here it is supplemented by the force resulting from *raising* or *depressing* the *elevators*. Possibly this was the answer. If the model stabilizer was made larger, then these forces on the fixed stabilizer would be proportionally as great as the combined stabilizer and elevator effect of the full scale plane. Then this cranky "production model" might fly successfully.

No time was lost in cutting out a new stabilizer and fitting it to the test plane (line B, Fig. 1); a

(*Turn to page* 40)

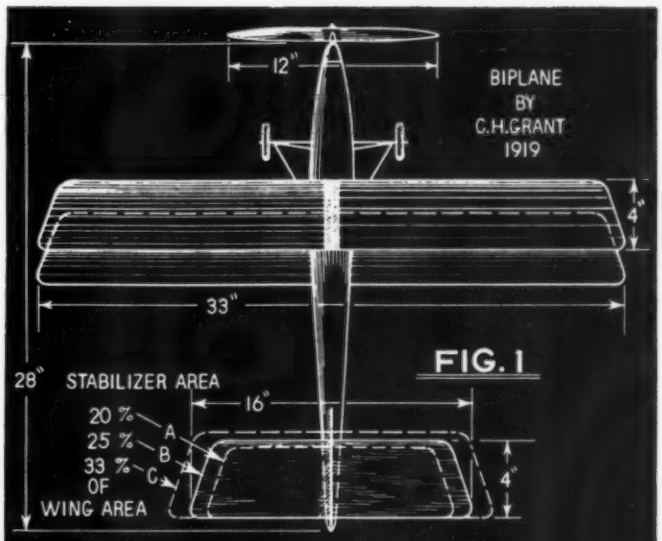


FIG. 1

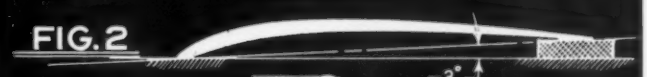


FIG. 2

FIG. 3

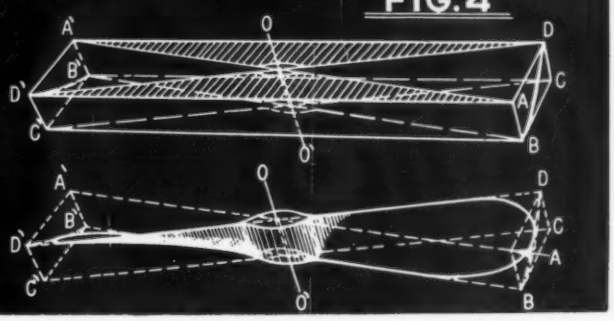


FIG. 4

The only modeler ever to hold all four speed class records at once, Lew explains a few simple tricks that can add precious miles to your time

by LEW MAHIEU
as told to
Bill Sweet

Add 10 Miles To Your Speed

PART ONE

IN THIS article, and in Part 2 which will follow next month, you will learn all the secrets of speed flying that have enabled Lew Mahieu to set Open Speed Records in all four engine classes. There are many important factors necessary to get that extra few miles per hour needed to put you in the winners' circle. Your plane design, engine, fuel, propeller, test flying, and contest flying, all are essentially important to your success. All these points for the Novice as well as the Expert will be covered in this series of two articles.

First, we shall discuss plane design. As you will see in the drawings, Lew uses the typical West Coast design. This design is rapidly becoming conventional throughout the country. One of the most important points of speed plane design is the cowling. You must have the proper type of cowling since it has a two-fold purpose: (1) it reduces drag by streamlining the airplane; (2) and more important it cools your engine. It is imperative that your engine be allowed sufficient cooling for peak performance. This one point of proper cooling, and sufficient air for the engine air-intake has been overlooked by many, including some of the experts. You will notice that Lew has given you a complete detailed drawing of the cowl he uses, as we cannot stress the importance of this point too much. By the use of this cowl, Lew found that he was able to increase his speed in all classes between 3 and 5 mph.

Your attention is called to the cowl drawing; notice that there are two passages for air, one going past the cylinder fins of the engine to cool it, the other directed into the fuselage, to supply air to the engine air-intake. The reason for the two passages is that you should feed the cool outer air into the engine air-intake, and not the hot air that has passed over the cooling fins of your engine.

In constructing your cowls, it is not necessary for you to sacrifice strength to reduce weight, because of the new standard line diameters specified in the 1950 rules. It is a very good idea to finish the inside of your cowl as well as you do the outside, because it will increase the efficiency of the cowl. The shaded areas on the cowl drawing are made of hard balsa, while the sides are made of 3/64" plywood or *Speed Skin:* Lew prefers *Speed Skin.* The space directly behind the exhaust stack (marked A on Figs. 2 and 3) is the continuation of the exhaust hole in the cowling. This allows the exhaust of your engine to escape freely, when the back part of the engine exhaust stack has been removed as shown in the drawing.

Before you design your speed ship, buy the spinner first; then shape the fuselage to fit the spinner. In this manner, you will be assured an unbroken line of air flow over the spinner and the fuselage. Lew does not have any particular preference in spinners; he believes that the blunt-nose and the needle-nose styles are equally satisfactory. In cutting notches in the spinner for the propeller blades, do not cut them any larger than absolutely necessary.

All of Lew's speed planes have metal wings, not because they are more efficient, but because they are more rugged and will withstand minor crack-ups and rough landings better than wings constructed of wooden materials. He uses 1/16" plywood for the stabilizers on his Class A and B ships and 3/32" plywood on the Class C and D jobs. His fuselages are made out of Philippine mahogany. The reason he uses this material is that it is *not* a straight-grained wood and will not split readily on rough landings.

The aerodynamic balance of your speed ship is very important. You should not have your balance point any further forward than the front lead-out wire. If your plane balances ahead of this point it will have a tendency to "crab" or fly at an angle that is not perpendicular to the line of thrust. If the balance point is further back than the midway point of the lead-out wires, your plane may become too sensitive on the controls.

Lew has assured me that he has the fuel tank problem solved. This problem has been a bug-a-boo of speed fliers for years. After building and experimenting with tanks for months, Lew finally has come up with one that is foolproof. With this new type of fuel tank you will be able to adjust your engine while the plane is on the ground, and it will reach its peak after about four laps in the air. Remember that the flat side of your fuel tank should be placed in a plane parallel with the line of thrust. Also, be sure that this same flat side is toward the control handle. (See Fig. 4). It is important that the fuel line to the engine be as short as possible. Your fuel tank may be constructed of various materials. However, Lew prefers tin because it does not have a tendency to corrode from the remaining bit of fuel that is always left in the tank after a flight. He is using 2, 2½, 3½, and 4 oz. tanks in his class A, B, C, and D ships respectively. This gives an average flight of about 1½ minutes in the air on each ship.

Now for engines. Lew uses *McCoy* engines in all his speed ships. He did not make any major changes on any of these engines, but did enlarge the intake venturi and cut out the back part of the exhaust stack as shown on the drawing. (Fig. 3). He assured me that anyone can take a good stock engine, make these minor changes, follow the hints in these articles, and gain at least ten miles per hour over his previous speeds. If desired you can turn down the cooling fins of your engine, which will allow you to install a smaller cowling. Remember that the engine manufacturers have spent many, many hours in research and design of racing engines. They are in a position to give you the fastest engines possible; as a matter of fact they are forced by competition to give you the ultimate in

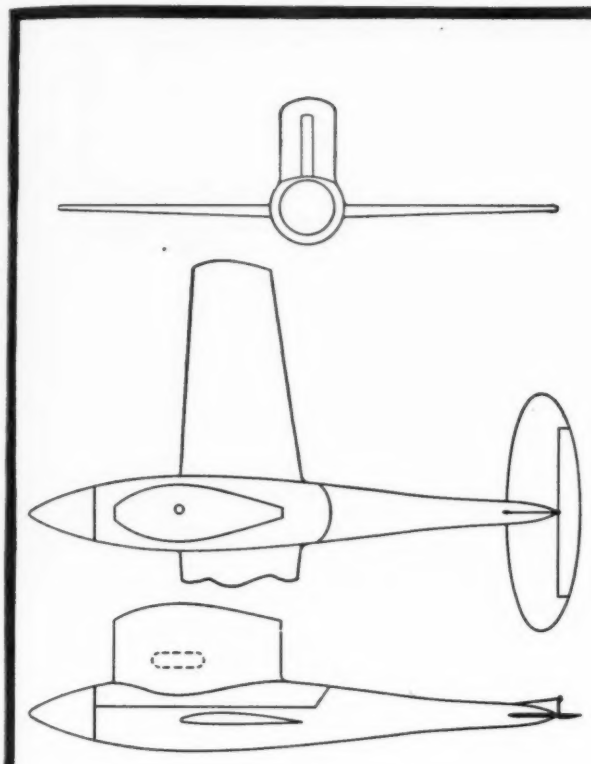


FIG. 1

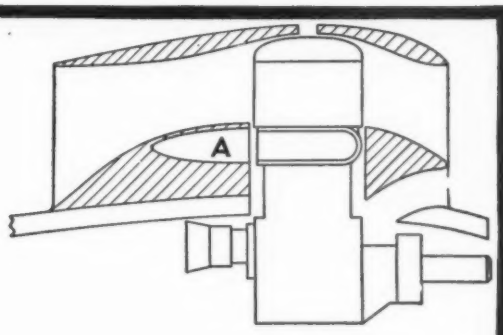


FIG. 2

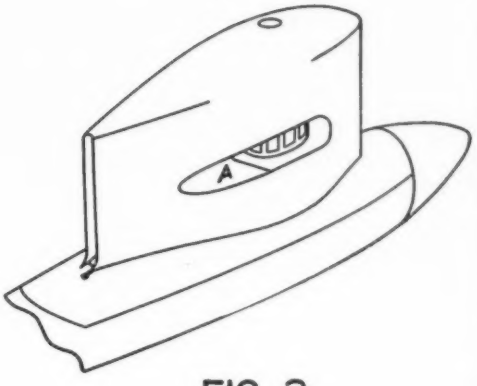
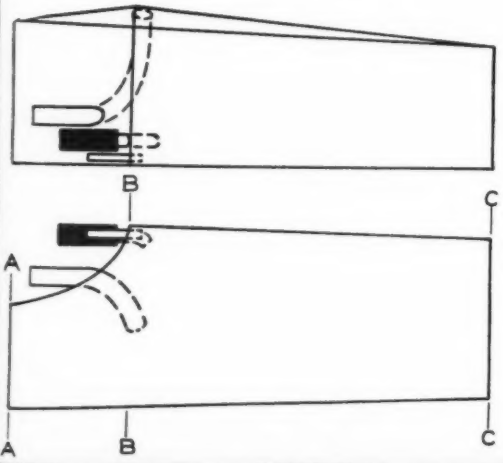


FIG. 3



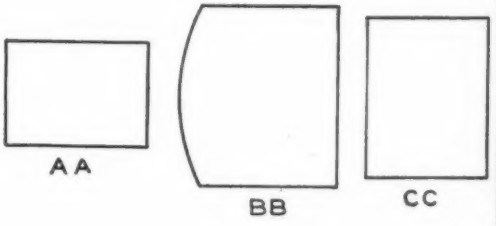


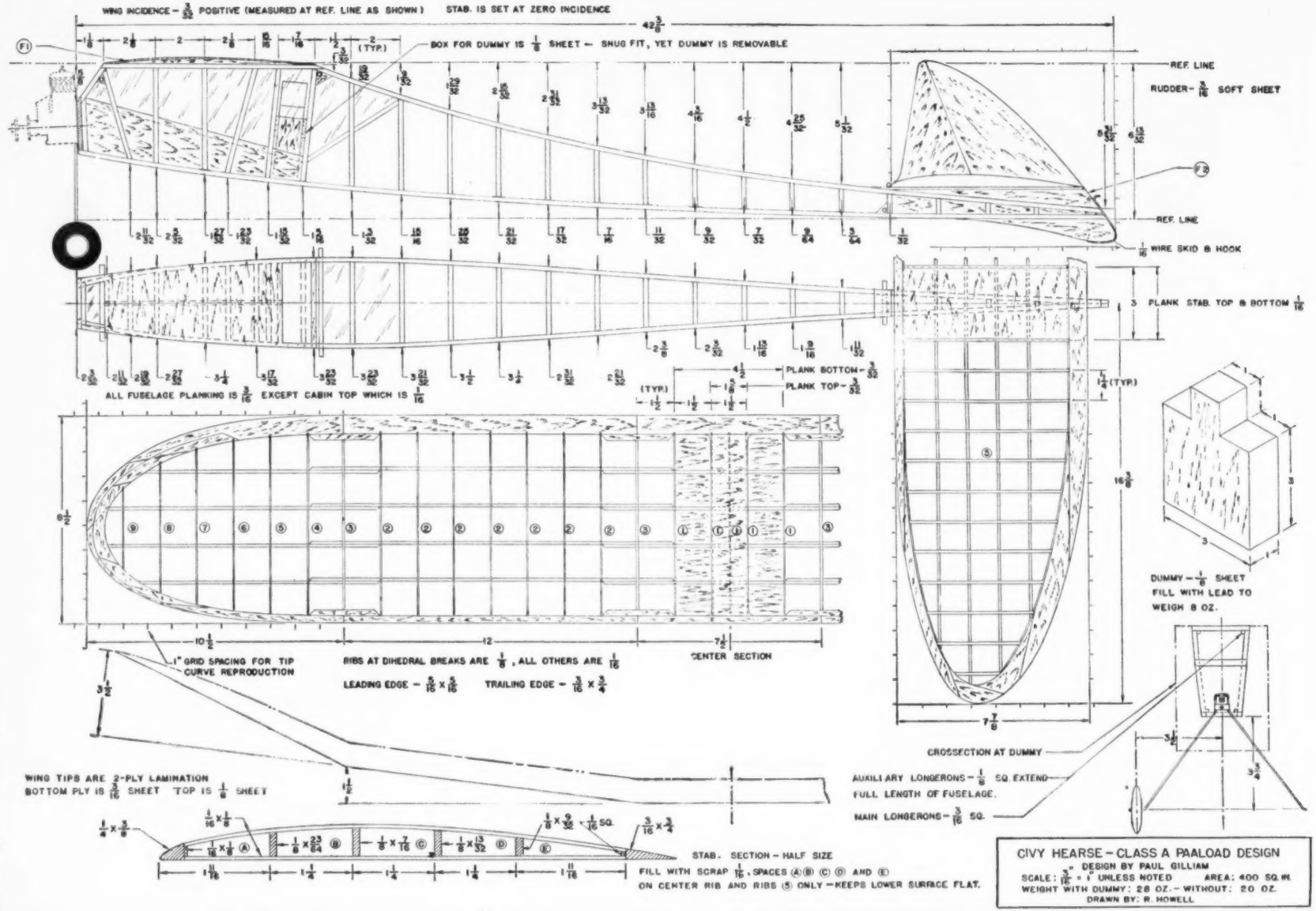
FIG. 4

performance. Lew suggests that you do not tamper with your engine, as you may suffer a power loss instead of a gain!

Fuels have given many a speed boy a headache. I recall the fuel trouble that Don Newberger and Wally Wallich had at the Wichita Nationals in 1946. It may be that you will have to vary your fuel mixtures slightly under adverse conditions. The first thing that Lew does when arriving at a strange field and area is to make a test run with straight *Supersonic 1000* fuel. If the engine has a tendency to run rich, or to four-cycle, it suggests that the engine is running too cold and the fuel needs a slight extra amount of nitro-methane added to the mixture. Never add more than two ounces of nitro-methane to a pint of *Supersonic 1000*. If your engine overheats, which is indicated by a crackling sound or pre-ignition, you should add a little castor oil, which acts as a cooling agent. You should not add more than one ounce of castor oil at any time to the above stock fuel.

To give you an idea of how Lew varied his fuel mixture in making his record flights, here they are: his Class A record came on October 15th at Las Vegas. The day was warm, clear, and dry. With straight *Supersonic 1000* his speed was 126.76 mph. The Class B record was made October 1st at Los Angeles on a very hot, clear, and dry day. Because of the heat of the day, his engine had a tendency to pre-ignite slightly, so he added an ounce of castor oil to a pint of standard fuel. After the castor oil had been added, he turned in a record speed of 138.41 mph. On his Class C flight, which was made at Las Vegas, Nevada, October 16th, the

(*Continued on page* 36)



CIVY HEARSE – CLASS A PAALOAD DESIGN

DESIGN BY PAUL GILLIAM

SCALE: 3/16" = 1" UNLESS NOTED AREA: 400 SQ. IN.

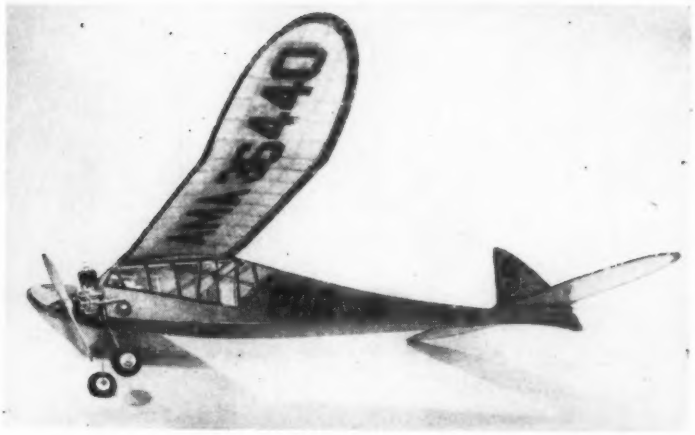
WEIGHT WITH DUMMY: 28 OZ. – WITHOUT: 20 OZ.

DRAWN BY: R. HOWELL

civy hearse

This little ship can carry a real PAA-Load and still turn in fine performance

by PAUL GILLIAM



THE *Civy Hearse* can fill a double bill for contest flying . . . as an AMA Class A Free Flight design, flown without the 8 oz. dummy, and as the load-lift model for which it was originally designed. The first *Civy Hearse* was built for the PAA-Load event at the 1949 Nationals at Olathe, Kansas. The first official flight for the *Hearse* at the Olathe meet was only the second time the ship had been in the air. The model caught onto the tail-end of a nice riser and, working its way up into the thermal, turned in a good flight, placing me second to my good friend, Raymond Matthews, of Oklahoma City.

For use in the Pan American PAA-Load event, the *Hearse* weighs 28 oz., which allows an average wing loading of 7 oz. per 100 sq. in. This PAA-Load model was designed for use with the Class A *Civy Boy* wing and stabilizer; the wing area is 400 sq. in. and the stab area 200 sq. in. The model's common longitudinal balance is at the trailing edge of the wing; this arrangement, with the long stabilizer moment and the 50%-of-wing-area stabilizer, gives the design just about the most soaring glide to-date in our present state of free flight design. Actual tests and experiments with the rearward center of gravity, long stabilizer moments, and the large stabilizer area have indicated that any design using this combination can surpass the more conventional designs by 25% to 30% lift, thus increasing the glide or the dead air duration time in the same proportion, depending, upon the adjustment proficiency of the flier.

While I was at the 1949 Nationals with the *Civy Hearse*, I overheard a comment by a young modeler. He had said to his friend: "Gee! The fuselage on that model surely looks funny." True! The fuselage does look odd, as compared to conventional full scale airplane proportions, but it is the author's opinion that the shape of the fuselage has much to do with the fine performance of the model. The upswept front section of the fuselage was designed intentionally to give the wing and stabilizer vertical positions the same relationships that are applied to typical pylon designs, such as Denny Davis' *San de Hogan*, and the *Civy Boy*.

The plans are drawn to a scale of 3/16"=1", with full size dimensions. Study plans carefully and prior to scaling plans to full size, fill in the grid lines indicated on plan, to accurately reproduce the same curves of the wing, stabilizer tips, and rudder. Balsa, ranging from medium to hard stock was used in the construction of the original *Civy Hearse*. The total flying weight of the first model was exactly 20 oz., less the 8 oz. dummy occupant. Builders of this design will find no difficulty in keeping the bare flying weight of the model to 20 oz.

The fuselage is of box-type construction using 3/16" sq. hard balsa. Before you begin to construct fuselage sides, splice two long pieces of 3/16" sq. from standard 3' balsa stock for use as the lower longerons. Lay out the two sides of the fuselage box, building one side directly on top of the other to obtain absolute uniformity. Cut and cement in place the upright pieces of 3/16" squares. Cut two identical pieces of each pattern F-1 and F-2 from 3/16" sheet and cement into place on plan. When fuselage sides are dry, separate the two and cement the crosspieces in place using pins and small rubber bands to hold while drying.

The fuselage firewall is 1/4" plywood and is heavily cemented in place, before the fuselage box is block-sanded. Add the 3/16" sheet planking to the fuselage in front and rear as indicated on plan. The fuselage section under the wing is planked with hard 1/16" sheet with grain running crosswise. Note: the position in the cabin for the dummy occupant. Use 1/8" sheet to plank a tightly-fitting compartment inside cabin for the occupant. Also note that the occupant is positioned with rearmost part near the trailing edge of the wing. THIS IS IMPORTANT! *Do not relocate the occupant.* Note: on the fuselage top view all of the cabin area under the wing is not planked; leave a hatch under the rear of the wing for inserting and removing the dummy.

The stabilizer platform is made from 1/8" sheet with grain running across the fuselage.

At this point we should consider what Class A engine will be used in order to drill the engine-mount machine screw holes in the firewall. Cement nuts thoroughly on the back side of the firewall to receive the engine mount machine screws. If an *Ohlsson & Rice .19* is used as on the original, the engine may be mounted radially to the firewall. When the *McCoy .19* is used, a small metal engine mount or hardwood beam mounts

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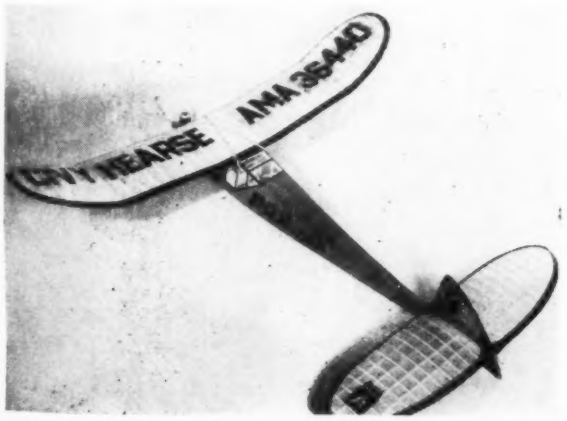
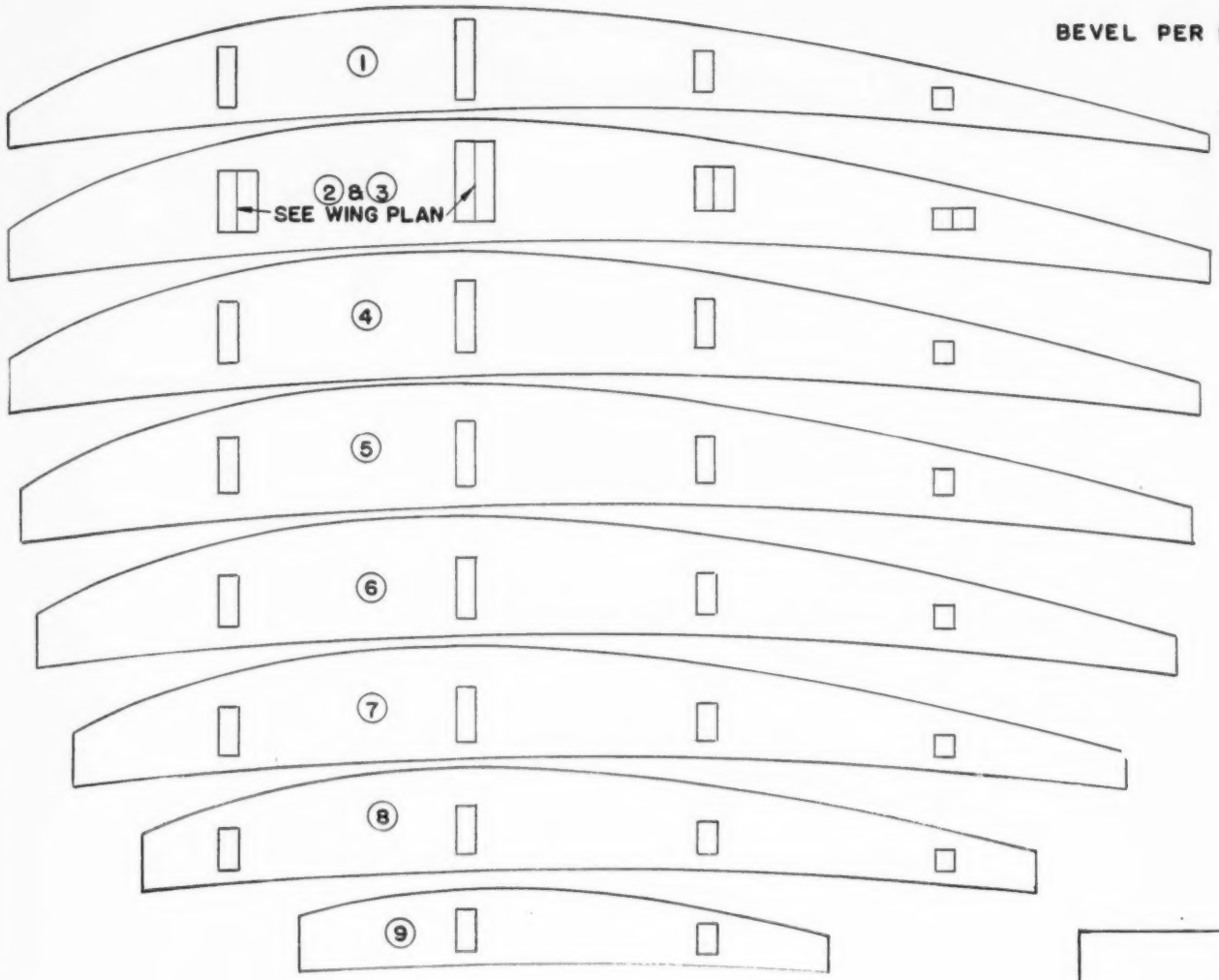
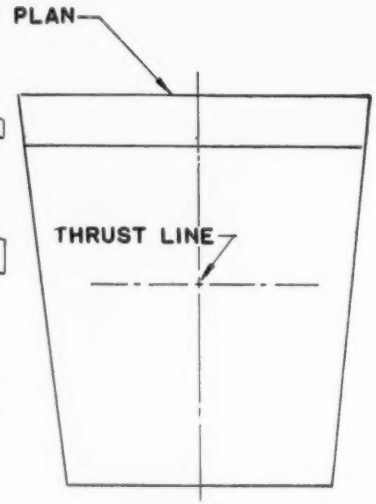




FULL SIZE WING RIBS



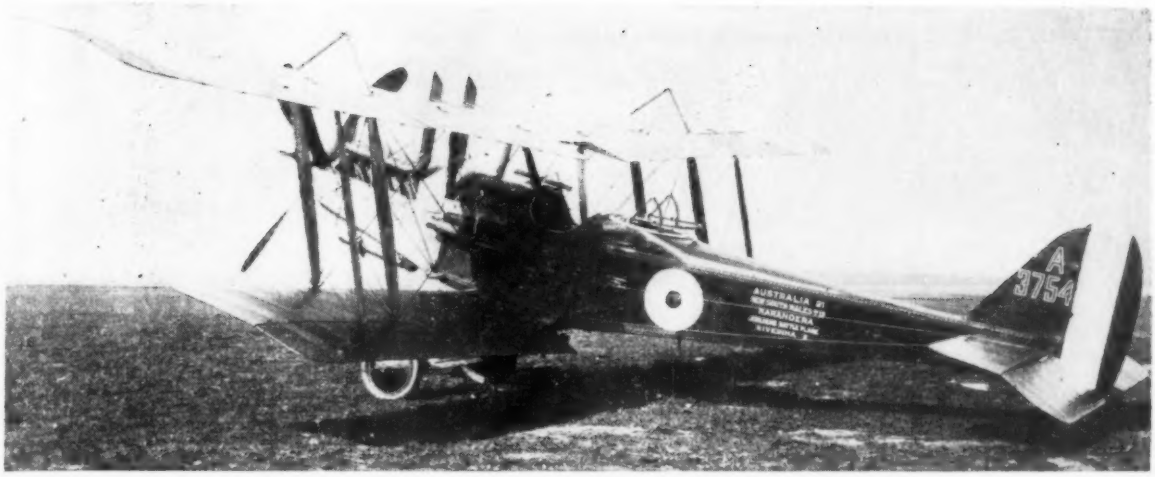
FIREWALL
1/4 PLYWOOD

CIVY HEARSE

CLASS A PAALOAD DESIGN

DESIGN: PAUL GILLIAM

DRAWN: REAGAN HOWELL



Large upper wing overhang was braced by triangular cabane struts on the upper wing

WORLD WAR I

R. E. 8 PART ONE

by ROBERT C. HARE

COST of construction and development was one of the major problems confronting a would-be aircraft manufacturer in the early days of aviation, just as it is today. In some instances, governments undertook the development of aircraft for "military" purposes. One of the most notable trends in this direction was in England where, in 1911, the Army Aircraft Factory was organized to develop balloons. A year later, almost coincident with the British Military Aircraft Trials—a flight competition staged for the benefit of private builders seeking government contracts—the name was changed to Royal Aircraft Factory.

It is a matter of record that in those days, the British air arm was equipped nearly 100% with foreign-made planes. There were, however, a number of designs under construction at the Royal Aircraft Factory that later, with development, proved very useful. Every design was called Experimental, with a prefix denoting the category. Thus B.E. was taken to mean *British Experimental* and was applied to general purpose types; F.E. denoted *Fighting Experimental;* R.E. stood for *Reconaissance Experimental* and S.E. for *Scouting Experimental.*

The idea behind the Royal Aircraft Factory was solely to design and develop acceptable military types, then assign actual production contracts for manufacture of the various types to the lowest bidders. This had the effect of putting in business a lot of firms, most of whom were already going concerns in some other line, but who then established aircraft departments.

It can be said that without exception, all the planes developed by the Royal Aircraft Factory were good designs. At a time when Europe was arming for World War I, England had the best aeronautical brains in the land hard at work designing official types. The government was in a position to appropriate large sums of money for research work, which was something a private individual could not possibly do unless he had tremendous backing. And in those days there were very few men willing to "throw their money away" on so doubtful a thing as the future of aviation.

When the Royal Aircraft Factory got into serious operations on heavier-than-air craft, the plan was to develop each of the experimental lines mentioned above. First product of the Factory was the B.E. 2, which was entered in the 1912 trials. This was a conventional tractor two-place biplane. The first F.E. type was a pusher version of the B.E., with a cockpit in the nose to accommodate a gunner-observer.

The R. E. 8

Models identified as *Reconaissance Experimental* began as modifications of the B. E. line. Their principal characteristics were slightly more wing area, greater weight, greater fuel capacity, and more powerful engines. Type R. E. 7 was the first of the series to be produced in any quantity. It was a huge, cumbersome airplane with a tricycle landing gear. From it the R. E. 8 was born to be one of the best planes in its class.

This statement may surprise some of you who have read of the R. E. 8 as a "sitting duck" and other uncomplimentary names. Probably no other World War I airplane has been so maligned in fact and fiction. But it is human nature to criticize, and the R. E. 8 really took it on the chin. Pilots and observers alike condemned it for not being fast enough, for not being able to fly high enough, and for not climbing fast enough. But when the smoke had cleared the record shows the R. E. 8 did a wonderful job in spite of its alleged shortcomings. It can be truthfully said that most pilots simply did not understand the R. E. 8.

In the first place, the ship was designed and built strictly as a reconaissance (observations and artillery spotting) airplane. It was designed to fly slowly; it landed at 40 mph, and could maintain altitude at 50 mph. It was designed to

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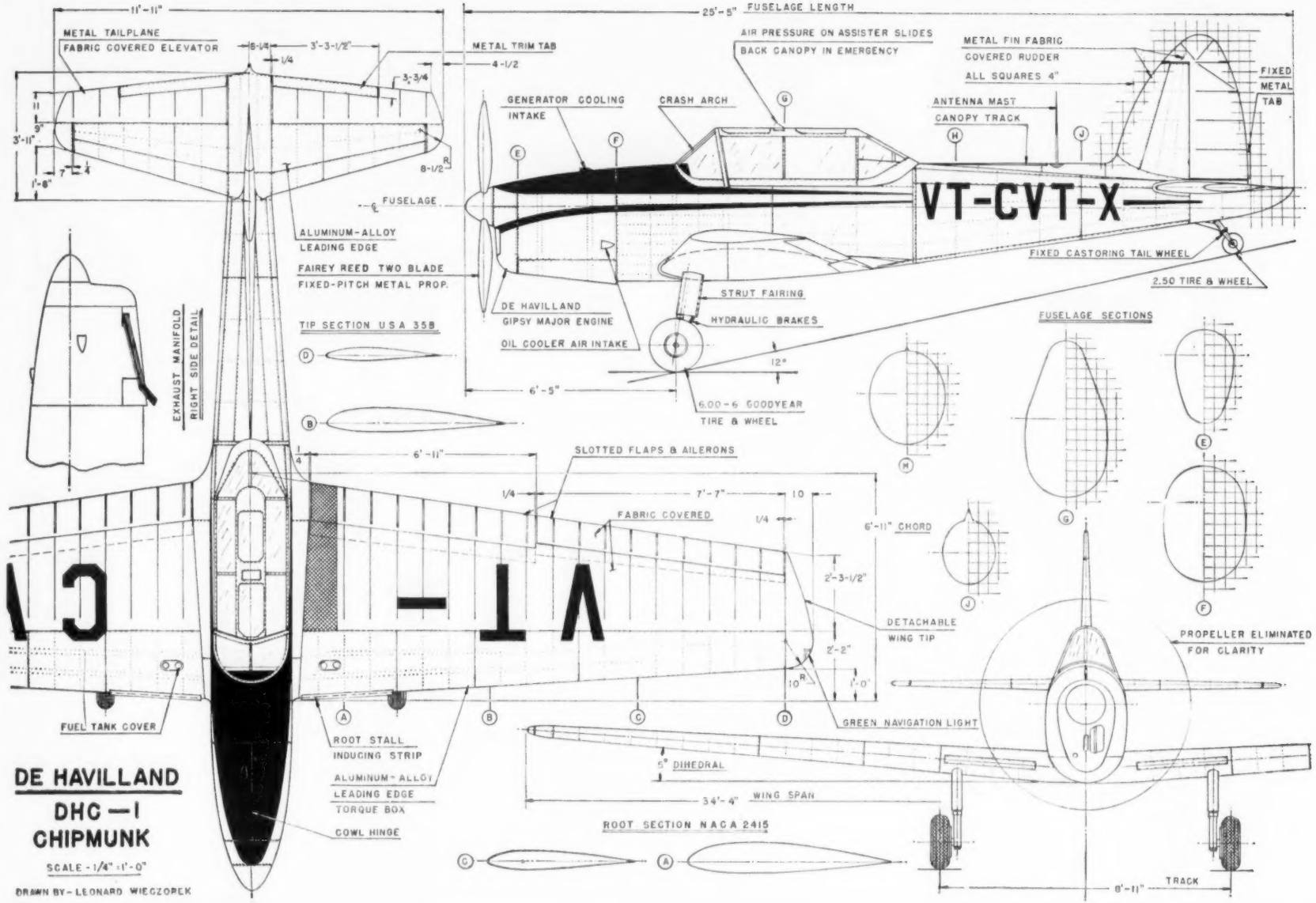
Slender fuselage, large air scoop and 4-bladed prop characterized R.E. 8

This is the R.E. 8 flown by Sandy and Hughes, and mentioned in the text


11'-11"
METAL TAILPLANE
FABRIC COVERED ELEVATOR
3'-3-1/2"
3'-11"
1'-8"
8-1/2
FUSELAGE
ALUMINUM-ALLOY
LEADING EDGE
FAIREY REED TWO BLADE
FIXED-PITCH METAL PROP.
TIP SECTION USA 35B
EXHAUST MANIFOLD
RIGHT SIDE DETAIL
6'-11"
SLOTTED FLAPS & AILERONS
7'-7"
FABRIC COVERED
6'-11" CHORD
2'-3-1/2"
2'-2"
1'-0"
DETACHABLE
WING TIP
FUEL TANK COVER
ROOT STALL
INDUCING STRIP
ALUMINUM-ALLOY
LEADING EDGE
TORQUE BOX
COWL HINGE
5° DIHEDRAL
34'-4" WING SPAN
ROOT SECTION NACA 2415
25'-5" FUSELAGE LENGTH
METAL TRIM TAB
4-1/2
AIR PRESSURE ON ASSISTER SLIDES
BACK CANOPY IN EMERGENCY
METAL FIN FABRIC
COVERED RUDDER
ALL SQUARES 4"
FIXED
METAL
TAB
GENERATOR COOLING
INTAKE
CRASH ARCH
ANTENNA MAST
CANOPY TRACK
VT-CVT-X
FIXED CASTORING TAIL WHEEL
2.50 TIRE & WHEEL
DE HAVILLAND
GIPSY MAJOR ENGINE
OIL COOLER AIR INTAKE
STRUT FAIRING
HYDRAULIC BRAKES
12°
6'-5"
6.00-6 GOODYEAR
TIRE & WHEEL
FUSELAGE SECTIONS
PROPELLER ELIMINATED
FOR CLARITY
GREEN NAVIGATION LIGHT
8'-11"
TRACK
DE HAVILLAND
DHC—1
CHIPMUNK
SCALE - 1/4" = 1'-0"
DRAWN BY - LEONARD WIEGZOREK

DeHavilland Chipmunk

by ROBERT McLARREN

Here is an attractive ship of interest to solid and flying scale builders alike; who will build the first free flight gassie model?

THE DeHavilland DHC-1 *Chipmunk* has already become the standard primary trainer of the Royal Air Force and has created a mild revolution in military training techniques in Great Britain. The classic biplane trainer went out of production in both Great Britain and the United States about in the middle of World War II when both nations independently decided that there were "enough" trainers on hand to handle the process of new pilots moving through the ever-shortening path from primary training to qualified combat pilot.

Both nations, again independently, began the preparation of specifications for new trainers during 1945, while the war was still in progress, calling for a complete revolution in trainer design. Because the biplane had disappeared quickly in combat aircraft, it was deduced that the biplane should also disappear in the training phase, since students could be more logically trained in the airplane configuration they would eventually fly in combat. Oddly enough, Great Britain and the United States came to the conclusion that the high-performance trainer was the solution to the training problem: examination of training records and numerous test cases seemed to indicate that the student pilot could be trained more quickly and effectively by starting him out initially in a "hot" airplane.

In England, the Royal Air Force laid down specifications for a three-seat monoplane powered by a turboprop engine and the Avro *Athena* and Boulton Paul *Balliol* were produced to these new specifications. Both weighed more than 7,000 lbs., and both had top speeds in the 285-300 mph class at altitudes ranging from 10,000 to 20,000': in short, high-performance aircraft. In the U.S., designs by North American (T-28) and Douglas (XT-30) were developed to surprisingly similar specifications: both weighed about 6,000 lbs. loaded and both had top speeds of about 300 mph. With the appearance of these four aircraft, (the Douglas XT-30 was not built), it appeared that the day of the lovable old primary trainer was gone and a new era of high-performance training, in which the student progressed all the way from his first ride to combat tactical training in the same airplane, was under way.

But such was not to be, for both countries overlooked the simple fact that you simply can't change the human animal, with all its fears and prejudices, failings and limitations. As a result, both countries, again dependently, made another 180° turn in their thinking and went right back to where they started from: a primary trainer is always going to be needed for that all-important initial phase of taking a young man up (frequently for his first airplane ride) and teaching him the bare fundamentals of flight. In the U.S., the Air Force is still holding extensive competitions between the Beech T-34 *Mentor*, the Fairchild T-31 and the Temco T-35 *Buckaroo*, all weighing less than 4,000 lbs., all flying at about 160 mph; and in Britain, future R.A.F. pilots are being trained in the DeHavilland *Chipmunk*, our "Plane of the Month."

The *Chipmunk* is a product of a fine, old tradition in Royal Air Force training history, yet it started life as something of an upstart in the DeHavilland organization. The name DeHavilland goes way back into World War I when the D.H. 4 quickly became the standard observation plane of both the British and U.S. forces. These planes were designed by Geoffrey de Havilland as an employee of the Aircraft Manufacturing Company, which produced them in great quantities. After the Armistice, the DeHavilland Aircraft Company was formed by the management of the Aircraft Manufacturing Company and a variety of models based on the successful D.H. 4 was produced. In 1925 two events took place that were destined to shape the course of the company for decades: the first De Havilland aircraft engine was produced and installed in the first De Havilland *Moth* training plane. The combination was magic and the "*Gipsy*-powered-*Moth*" became almost a symbol of flying throughout the British Empire. The combination was gradually improved through the years and R.A.F. pilots received their primary training as late as 1944 in this same "*Gipsy*-powered-*Moth*," although the airplane used was actually the D.H. *Tiger Moth* powered by the D. H. *Gipsy Major* engine.

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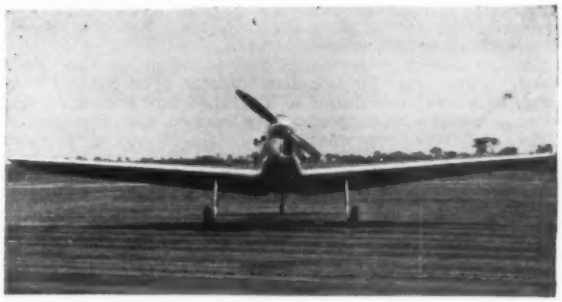
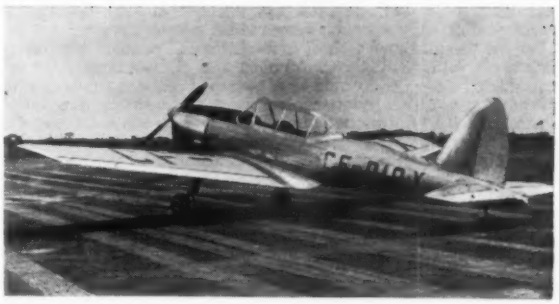




DRAWN BY - LEONARD WIECZOREK

flying models and the air force

The story of a model builder's paradise run by the Air Force to speed development of the big planes

by JERRY LEMELSON

THE Air Materiel Command of the United States Air Force is making a serious business of building and flying controline models and in doing so, has unofficially broken all existing speed records. The exact speeds attained are secret at present but it has been released that the 200 mph mark has been topped.

Thus controline model flying has graduated from its role as a source of sport and enjoyment to millions of model enthusiasts throughout the world to that of an aeronautical research tool, and it now plays an important part in the development of new military aircraft.

The models in general are somewhat larger than those usually constructed by modelers for controline flying. They range in wing spread from 4 to 20' and require from six weeks to nine months to complete. Construction cost may run as high as $25,000, which would put them a bit out of the reach of the average modeler's pocketbook. They are designed, manufactured and flown by members of the Dynamic Model Unit (a division of the Air Materiel Command at Wright-Patterson Field, Dayton, Ohio), to test the flight characteristics of new designs about the pitching axis.

The unit is headed by Adam J. Stolzenberger, an ex-Air Corps pilot, test engineer, and a model builder of long standing, who is responsible for the founding and direction of this new phase of aeronautical research. His dreams are just beginning to materialize, as the success of the venture is further affirmed with each new model tested.

Due to the size and weight of each model, control is attained through a pylon at the center of the flying circle. Wires extending beyond the circle to a control stick are connected to mechanism on the pylon which, in turn actuates the usual control wires to the model. Jim Walker of U-control fame was one of the first to experiment with control from outside the flying circle in this manner, and a number of articles have appeared in the model magazines on pylon flying.

Tests are conducted by the Dynamic Model Unit at present on everything from four engined bombers to sleek jet racing planes, by putting them through their paces and photographing the flight from the center of the flying circle. This is accomplished by placing a camera on the control wires near the pylon so that it follows the model in flight. The test engineers thus have a continuous photographic recording of the flight, which can be used to study the dynamics of the model. The results are more accurate than similar tests on radio controlled free flight models since the model remains at a constant distance from the camera which is always trained on it. In addition, wire-guided models are easier to handle. Radio controlled jobs, however, have the advantage of being free to move about all three axes. To complete the research picture, both techniques will ultimately be employed together.

Let's look over some of the models which comprise virtually a miniature air force. One of the first designs to be tested by the unit (not a controline model) was a model of the XFG-1, an unconventional glider with swept-forward wings. It was this airplane which started the ball rolling and eventually lead to the development of the control line testing technique.

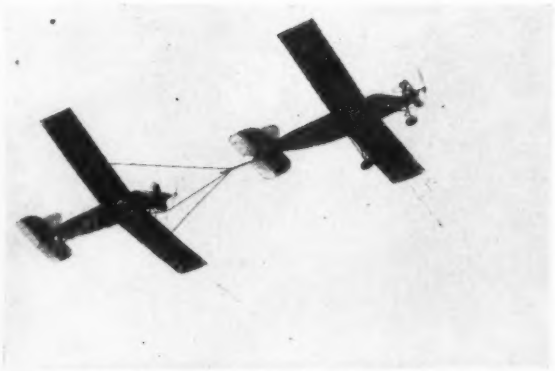
Wind tunnel tests of the glider indicated that it would perform well under many flying conditions. They were not conclusive and did not indicate that the design had poor spin recovery characteristics. When the full scale glider was put into a spin by a test pilot, it never recovered. The pilot was killed and the craft was a complete washout.

It was then decided to run a series of flight tests on a radio controlled model of the glider. Upon completion of the miniature XFG-1, it was carried aloft by a Navy blimp and launched. The ensuing series of tests brought to light a number of bad flight characteristics of the design which resulted in its abandonment by the Air Forces. From then on the model testing program grew to its present size. Radio controlled free flighters were soon followed by controline models which today are flown in circles up to 400' in diameter on a hill top near the air force base.

One of the first of the large controline models to be completed was that of a B-17 bomber with a 17' span. It is powered by four 2-cylinder model engines which develop

Sleek jet-propelled controline job that has hit 200 mph

Starting the special *Dyna-Jet* engine raises quite a dust cloud



Practical air refueling was first checked by stability tests made this way

U-Control Deluxe! A. Stolzenberger, at control stick, heads this A.F. field

Mr. Stolzenberger, a veteran model builder, checks miniature helicopter

Flying-wing glider showed need for the Dynamic Model Unit

Technician "winds up" 2-cylinder motor on a general-purpose controliner

Baby B-17 motors are started by a gas-engine driven flexible shaft

3 hp each. The spark-ignition engines spin three-bladed aluminum propellers at over 7,000 rpm. The engines weigh slightly less than 4 lbs. each, and starting is aided by a gasoline engine driven flexible shaft with a rubber end coupling which fits over the propeller hub. Other general purpose prop-spinning designs are similar in many respects to the racing and stunt models of sport control fliers. Several Army target planes (drones) have also been employed, in air to air refueling stability tests about the pitching axis.

The jet-propelled models utilized for controline flying and testing are powered by pulse-jet engines which develop as much as 30 lbs. of thrust each. One particular jet is approximately 4' long with a combustion chamber diameter of about 6'. Its intake valve bank is made up of five *Dyna-Jet* heads which are positioned circumferentially around a bulkhead inside the main inlet cowl. All fuel metering jets in the five heads connect to a common gas tank in the model. Two champion V-type spark plugs wired to vibrator spark coils are used for starting ignition. Starting air is supplied from a compressed air tank through a hose which connects to only one of the *Dyna-Jet* head's air fitting. This is sufficient to cause the whole engine to resonate provided that enough fuel is forced into the combustion chamber. Once the engine fires, all five heads function together. The term "resonate" is used to describe the intermittent type of combustion which occurs in a pulse jet engine. In many respects it resembles the forced resonation of air in an organ pipe and is certainly dependent upon the geometry of the particular jet engine for its cyclic frequency.

Getting back to this particular type of research jet engine, we learn that the fuel burned is a non-leaded variety of automobile gasoline. The starting compressed air required is from 100 to 150 lbs./sq. in. Once the engine is started, the compressed air line and ignition leads are removed and operation is self-sustaining. It is one of these jet models (illustrated) which topped the 200 mph mark during recent tests.

Let's take a look at one or two of the jet models which are probably zooming around the 400' diameter flying circle as this is written. Several designs have been completed utilizing the five-headed jet described above. Two resemble the V-1 buzz bomb, in that the jets are mounted above the fuselage. One has a single jet for thrust, whereas the other is powered by two such jets secured along side of each other. H—m—m, wish we knew the performance of this buggy. (Those two jets, producing almost 60 lbs. of thrust, create quite a push.

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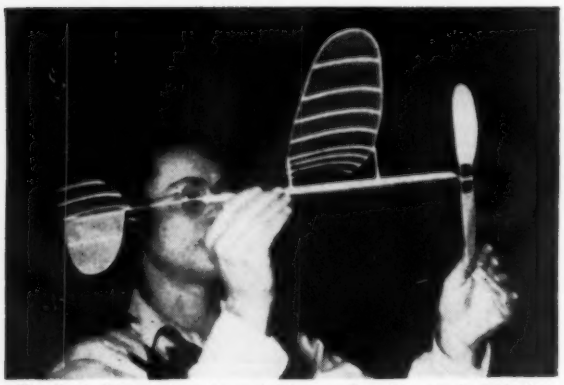


No. 1 L. Conover launches model in *Iowa City Gas Hawks* contest

No. 2 A. Dutson with F. A. I. glider; pic sent by B. L. J. Neal

air ways

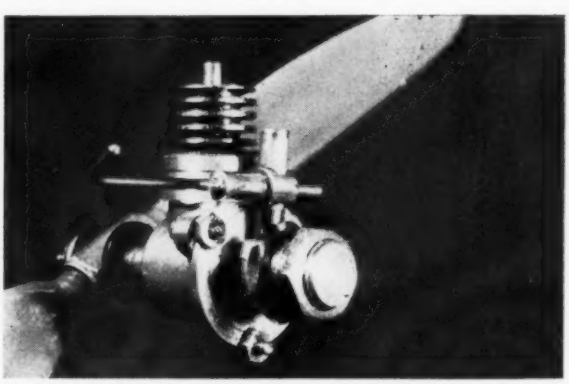
News of Model Airplane Experimenters From All Over the World

THE RADIO CONTROL PICTURE probably seems rather muddled in the minds of many of our readers, particularly those who have been waiting anxiously on the fringe of R. C. activity, still hesitant to take the plunge. Perhaps we can clear up matters a bit, by noting the present status of the Citizens Band and other licensing possibilities.

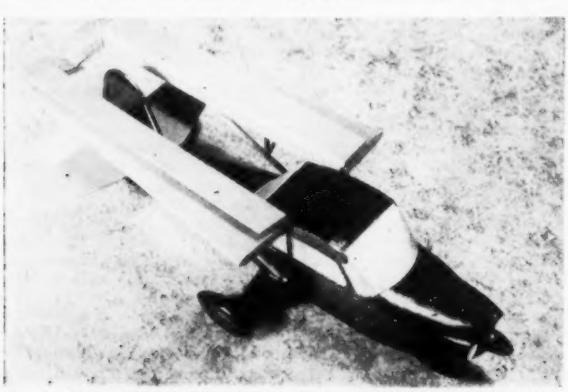
The Citizens Band seems to be foremost in everyone's thoughts, so let's discuss it first. We shall not go into detail on the provisions of this band as they were well covered in our article "*Radio Control For All*" (see January '50 issue); a few comments on present progress may be of interest, however. As this is written, *no* radio control equipment has received FCC approval. Such approval, of course, covers only the transmitter, but the technical requirements set up by the FCC are pretty tough. Not only must the transmitter frequency be very stable and free from drift, regardless of how the transmitter is handled (or mishandled!), but the frequency must be held within very narrow limits, regardless of tube aging, change in A and B battery voltages as the batteries are used, etc. This is really a problem, and we know of one manufacturer who has had a transmitter traveling back and forth from Washington for months while he has tried to please the FCC critics.

The FCC is entirely cooperative in this work, but the requirements are strict and they must be satisfied before any equipment can be certified. We have heard the rumor that the FCC has not O.K.'d any equipment, because they are planning to turn over the whole Citizens Band to the television interests. This doesn't make much sense. The Band was formally opened in July, 1949, and many

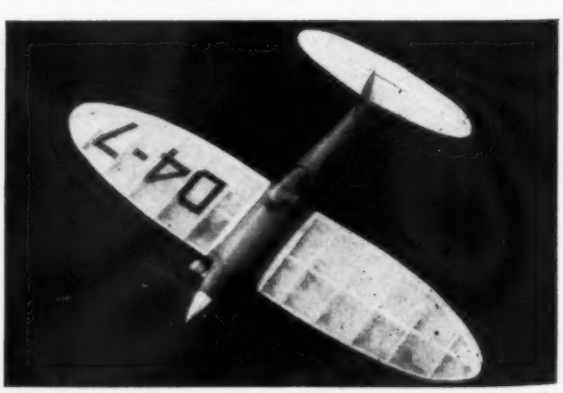
No. 3 Aeronca indoor scale flier used by L. Licher in a club contest



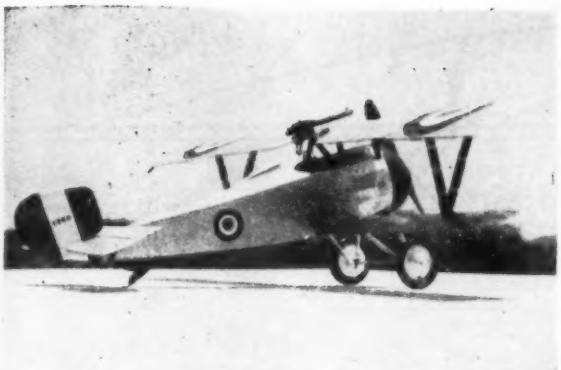
No. 4 *O. K.* CO2 motor converted to diesel operation by Ray L. Clough, Jr.



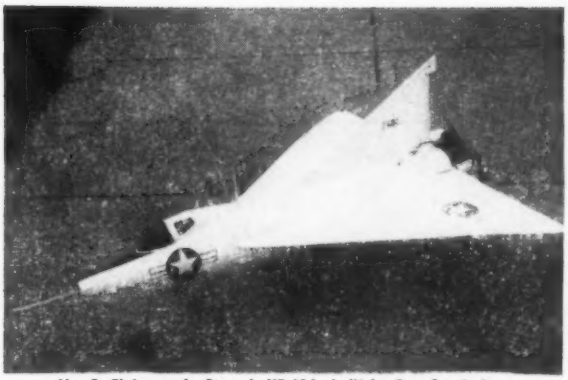
No. 5 Scale model of *Airmobile*, revolutionary design by Rene Charette



No. 6 Bernard Olney says this controliner is very popular in England



No. 7 Old favorite, a Nieuport 17, part of Ed Maloney's WWI escadrille



No. 8 Flying scale Convair XF-92A, built by Don Caminskey

concerns are actively engaged in developing equipment for use on this Band; at least one manufacturer has had a "walkie-talkie" approved. Radio control is only one of the proposed uses, and a rather minor one in the over-all picture, but we know that the Commission is still working actively with R. C. equipment makers, and the FCC assures us that the television steal is "just a baseless rumor."

Besides the 460-470 mc. frequencies, there is another band set aside for Citizen use, around 27 mc. We say "around" since the exact frequency has not yet been set, nor is the band officially "open," as is that of 460-470 mc. Of course, on the lower band, technical problems will doubtless be easier to solve. Many existing radio control components can be used there; for example, present-day radio control receivers which work on the 50 mc. amateur band can easily be converted to 27 mc.

But this band is not all gravy, by any means; also sharing the band will probably be diathermy and industrial heating units. The latter use very high power, and although they are not supposed to do so, often transmit a strong signal for hundreds of miles. Then too, there will doubtless be many other services clamoring for a spot in this band, and all of these, by nature of the propagation characteristics of these frequencies, can send out a signal that will carry many, many miles. Regardless of all this, however, the major fly in the ointment, is the fact that the FCC hasn't even definitely set the frequency limits of the band as yet; manufacturers are *not* being encouraged to submit equipment for approval. Therefore, we feel it best to forget about 27 mc. entirely for the present.

We can thus sum up the Citizens Band about like this:

1. There is *no FCC approved equipment* yet available.
2. Even after FCC approval is finally obtained, it will take a manufacturer quite a few months to get into production, to have his *production* models approved, and to get them distributed for consumer use. In light of recent developments, we do not feel such equipment will be available for at least six months and probably longer.
3. The Citizens Band apparatus will be expensive. The makers will have heavy engineering expenses to cover, complex test equipment is required, tubes and other parts cost more, and so on. We have heard $75 mentioned as a possible price for a complete single-control outfit; even this seems conservative.
4. Citizen R. C. transmitters work on a spot frequency, 465 mc., so only one can

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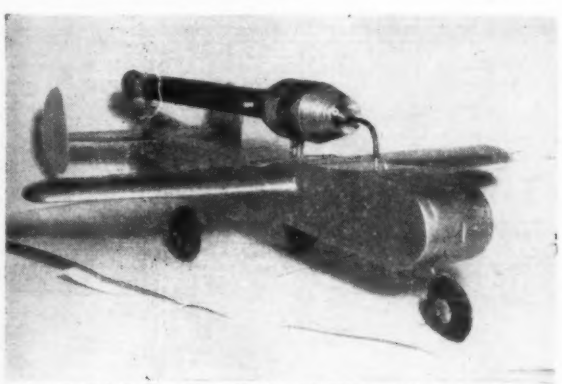
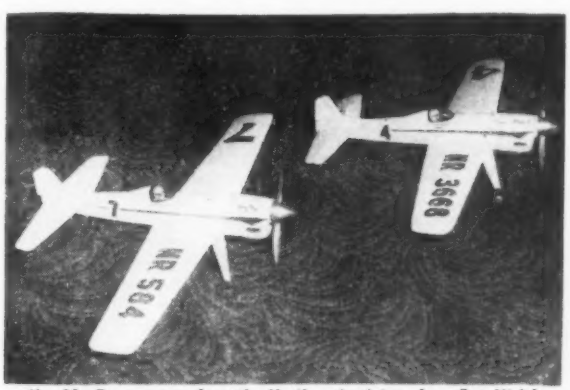
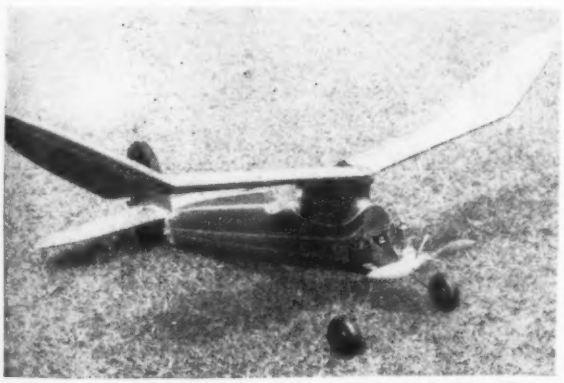


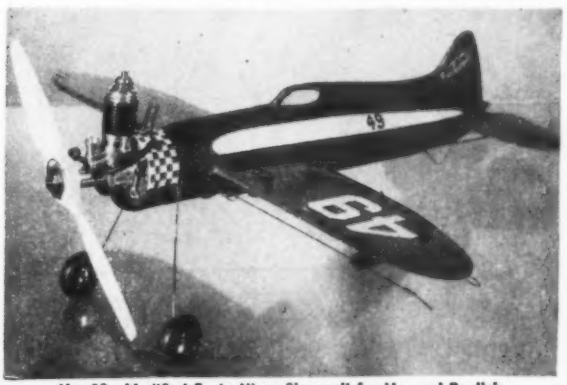
No. 9 This *Dyna-Jet* speedster has hit 128.3 mph for A. Jamrisko



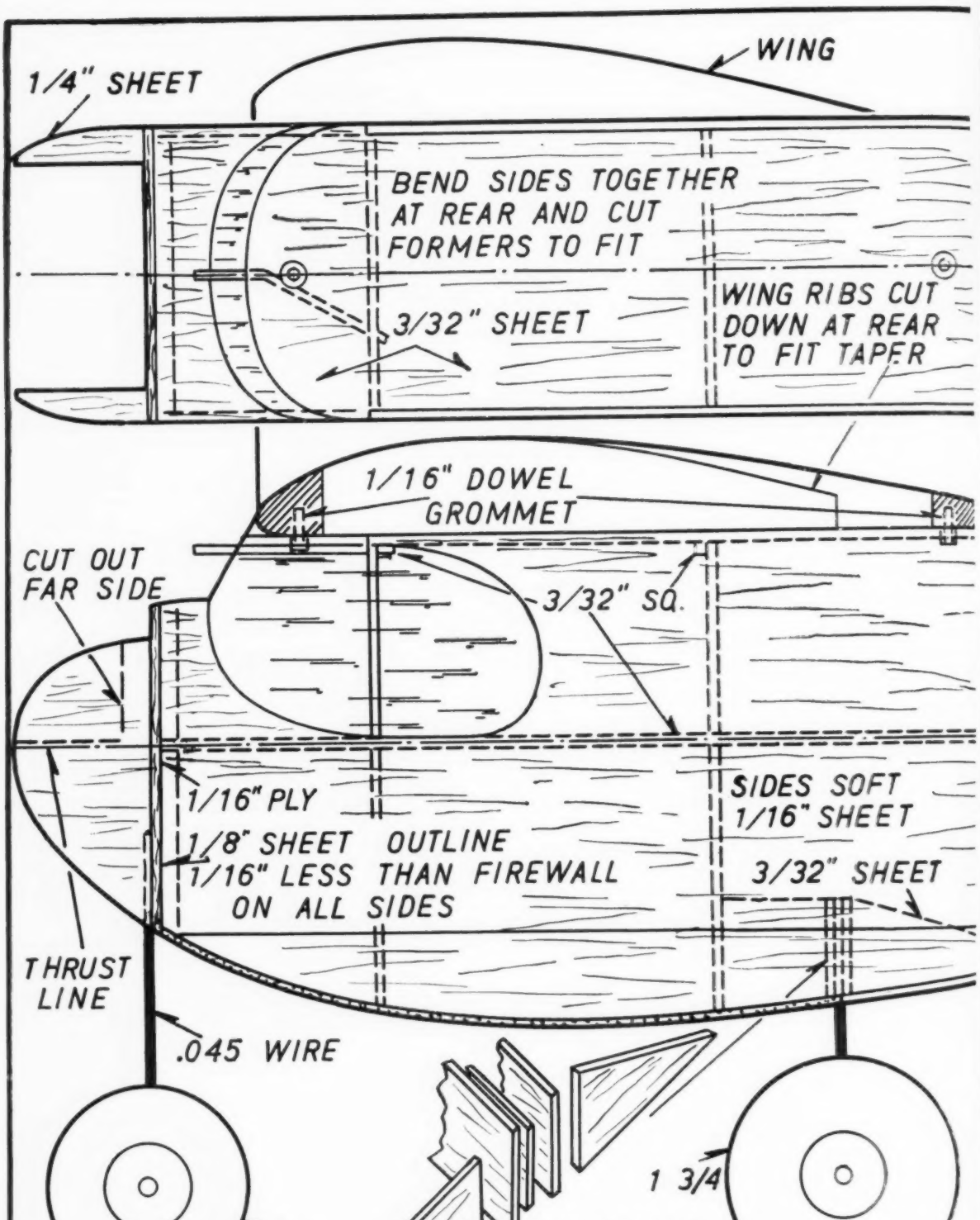
No. 10 Team racers from the Northwest; picture from Ray Welch

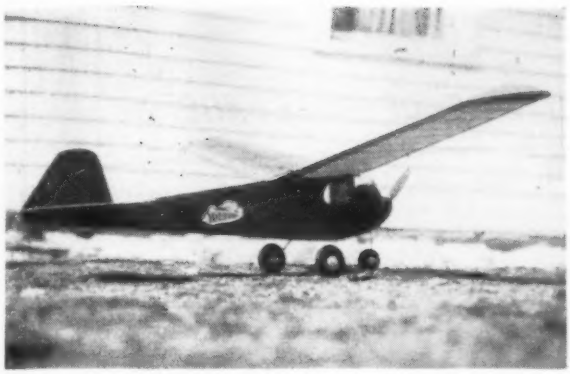


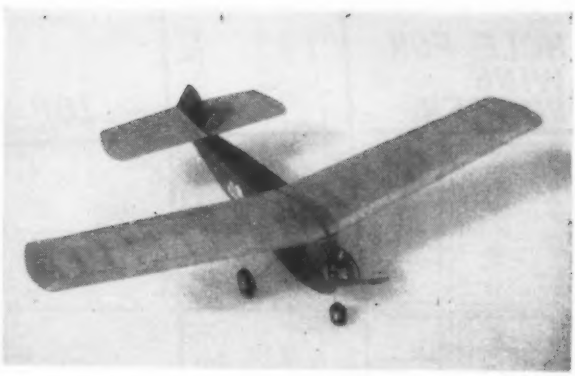
No. 11 A *New Ruler* from New Zealand—thanks to G. E. Codding



No. 12 Modified *Forty Niner* flies well for Howard Pavlick


WING
1/4" SHEET
BEND SIDES TOGETHER AT REAR AND CUT FORMERS TO FIT
3/32" SHEET
WING RIBS CUT DOWN AT REAR TO FIT TAPER
1/16" DOWEL GROMMET
CUT OUT FAR SIDE
3/32" SQ.
1/16" PLY
1/8" SHEET OUTLINE 1/16" LESS THAN FIREWALL ON ALL SIDES
SIDES SOFT 1/16" SHEET
3/32" SHEET
THRUST LINE
.045 WIRE
1 1/2"
1/16" SHEET
1 3/4
JOIN SHEETS FIRST FOR FUSELAGE THEN FOR WING





flyabout

Designed expressly for beginners, this ship is attractive and extra sturdy

by BILL WINTER

THE *Flyabout* is a realistic sport model for engines of .02 to .074 displacement. It will fly but not take off with the .02 and is over powered with the .074, so either the *K & B Torp Jr.* at .035 or the *O. K. Cub* .049 are its proper power plants. The ship shown in plans and pictures performs well on the .035.

About the only features out of the ordinary are the three-wheel gear, permitting automatic take-offs, and the sparless, tapered wing. The fuselage is all sheet, paper-covered, as are the tail surfaces. The *Flyabout* is easily made in two days and a fast-working expert can have it ready to fly in a day if he bears down.

CONSTRUCTION. By joining the sheets of plans along their long edges as keyed a full size plan results for the fuselage, rudder, and one-half the stabilizer; when finished with these portions, sheet two and three can be rejoined to provide one half of the full-size wing drawing, which is quite easily reproduced right hand for the other half panel.

The fuselage sides and formers are 1/16" sheet balsa, the sides being butt jointed for width on the forward half of the fuselage. The main formers beneath the wing are a standard 2" wide for simplicity. If construction is to be easy, several minor points need consideration before making with the razor blade. Note that the profile of the fuselage on the plan *includes* the top and bottom sheet covering, which means that 1/16" should be removed from the absolute profile along the entire bottom, and on the top from the wing back. The 3/32" thick cabin roof fits *within* the sides; the bottom sheeting, at the point of difficult bend on the bottom of the fuselage, has its grain running cross-ships. From the landing gear back, the bottom sheeting has fore and aft grain.

The easiest procedure for an accurate fuselage is to place the 3/32" sq. side pieces in the notches on formers 2 and 4, then cut out and glue in place the cabin roof. When this dries add the two sides, but do not join them at the rear.

Now follow up with formers 1 and 3 and only then bend the sides until they meet at the tail with a natural curve. Formers are not given for the section of the fuselage behind the wing because their widths should match the station widths of *your* fuselage. Since the formers are rectangles it is a simple matter to measure depth and width from your ship. Note that former 6 has its grain cross-ships; if any formers tend to buckle, reinforce them with a piece of 1/16" sq. across the grain.

Before adding top and bottom, construct the landing gear sandwich of three pieces of 1/16" sheet (see plan detail) and, having bent the main landing gear to shape, install the sandwich in the fuselage (check side view), filling in between it and former 3 with 1/16" sheet; between the sandwich and former 4, add long gussets of the same material. Both gussets and fill-ins cement to the inside of the fuselage sides. Add the 1/16" wing rubber dowels.

Cut out the 1/16" ply firewall. This should be drilled for the mounting bolts and for the binding of the front landing gear strut. Bend and attach this strut before putting the firewall in place. Put your mounting bolts through the firewall holes, and through the holes in former 1, then put on the nuts and draw the latter up tightly until they sink into the soft wood of former 1. Give the nuts several thin coats of good cement and when dry, withdraw the bolts.

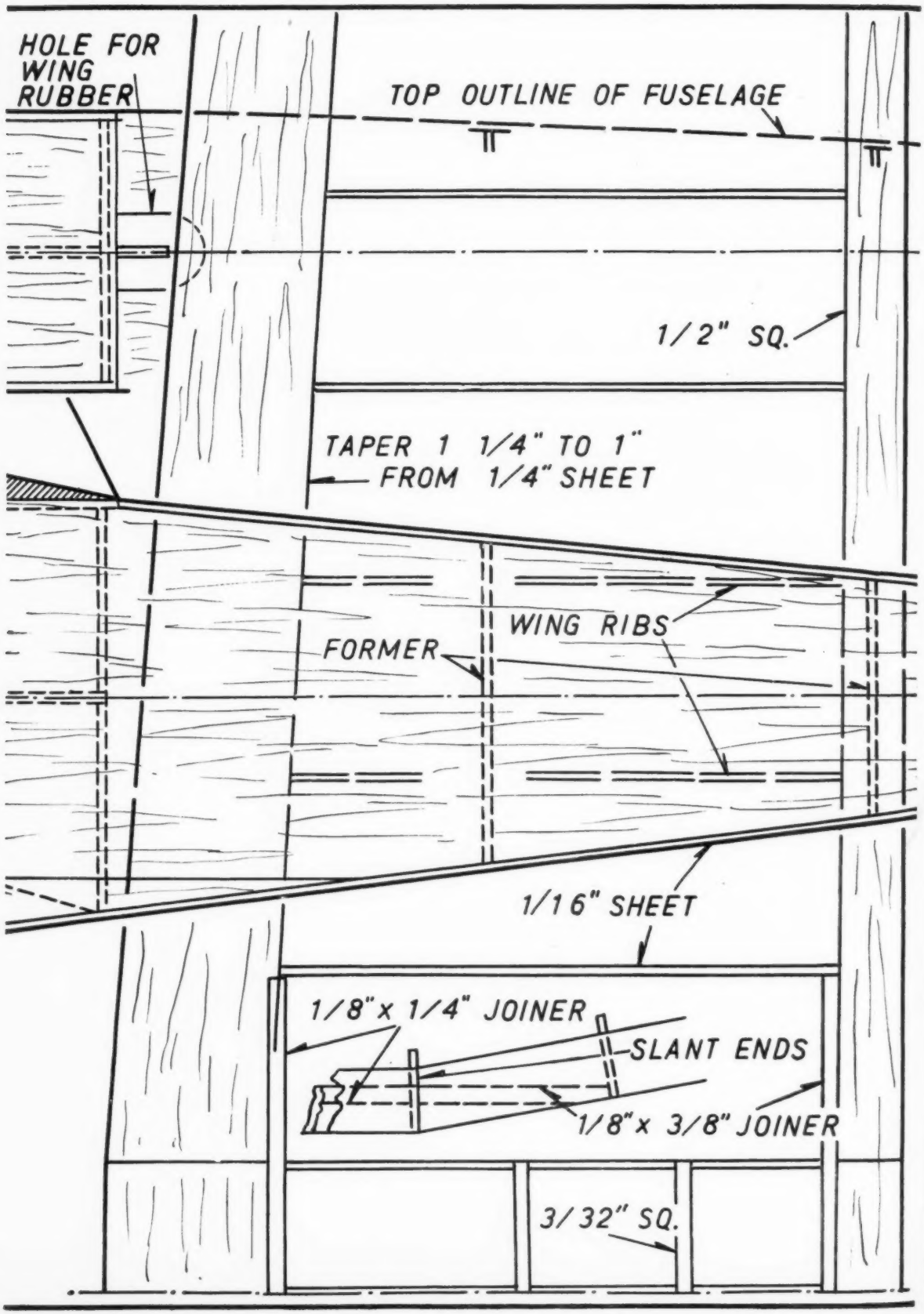
To add the top and bottom sheeting, trace the outline of the fuselage onto 1/16" soft balsa, then cut out the required pieces leaving about an 1/8" surplus all round for trimming. Begin at the nose and put on the cross-grain sheeting, then finish the bottom with the long fore-and-aft piece. Make sure that the sheet balsa is cemented to the formers as well as the sides. Add the top sheet; note cut-out for the rear wing dowel peg. Sheet over the top of the nose around the windshield with pliable 1/16" sheet and when dry, cut out to the proper outline. Add the 1/4" thick side pieces to the nose and the 1/16" thick stabilizer mounting platform.

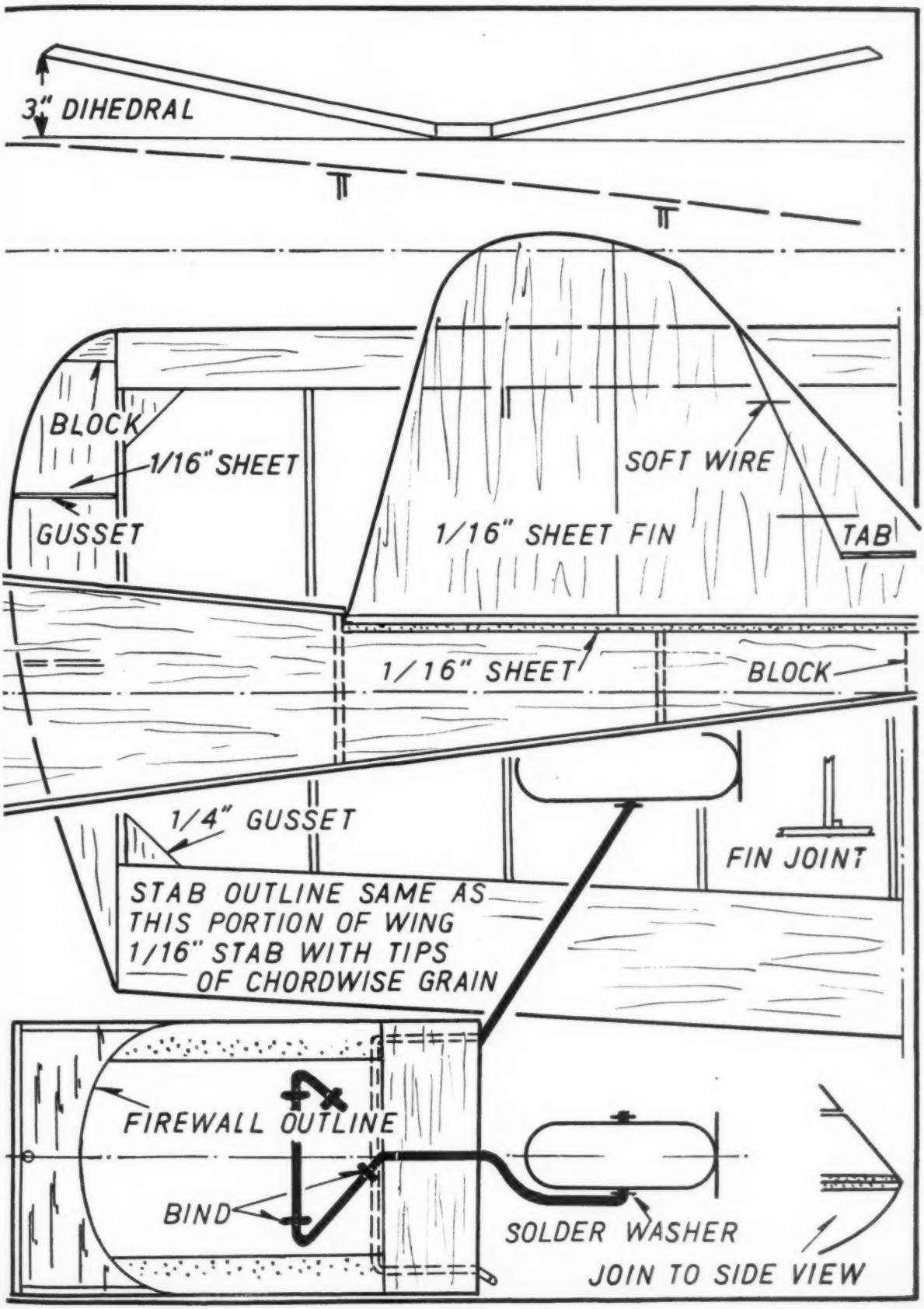
Give the entire fuselage a coat of clear dope, plasticized with about three drops of castor oil to the ounce of dope. When dry, cover the entire fuselage with blue rubber model tissue. Add the windows and windshield. If the windows are put on separately, a windshield pattern can be made from bond paper by trial and error, then celluloid may be cut to match. Make a hole for the dowel, work the windshield into position and pin at the corners to hold it in place. Place a thin bead of cement along its edges.

The tail surfaces are cut from 1/16" sheet balsa, sheets of which are glued together to obtain the necessary width. The stabilizer outline is the same as the tip of the wing and is marked on the wing plan. The stabilizer tips have their grain running fore-and-aft whereas the remainder of the surface has a tip-to-tip grain. After sanding the surfaces, coating them with plasticized dope to prevent warping, and covering with rubber model tissue (blue for the rudder, yellow for the stab). Cement along the stabilizer centerline a piece of 1/16" square balsa; the rudder is cemented to the stab and against the side of this strip. Note the rudder tab with soft wire for hinges. The completed tail is cemented lightly onto the stabilizer platform. Check its alignment carefully, especially to see that one tip is not higher than the other when the fuselage is level.

The wing is very easy to make. Mark out the tapered trailing edge on medium hard 1/4" sheet, then cut out with a razor

(*Turn to page* 37)


HOLE FOR WING RUBBER
TOP OUTLINE OF FUSELAGE
1/2" SQ.
TAPER 1 1/4" TO 1" FROM 1/4" SHEET
WING RIBS
FORMER
1/16" SHEET
1/8"x 1/4" JOINER
SLANT ENDS
1/8"x 3/8" JOINER
3/32" SQ.


3" DIHEDRAL
BLOCK
1/16" SHEET
GUSSET
SOFT WIRE
1/16" SHEET FIN
TAB
1/16" SHEET
BLOCK
1/4" GUSSET
FIN JOINT
STAB OUTLINE SAME AS
THIS PORTION OF WING
1/16" STAB WITH TIPS
OF CHORDWISE GRAIN
FIREWALL OUTLINE
BIND
SOLDER WASHER
JOIN TO SIDE VIEW

improved pulse system

by E. PAUL JOHNSON

AFTER returning from the 1949 Nationals in Olathe, Kansas, happily in possession of Second Place in the Radio Control event and a whole head full of ideas. I immediately set to work to improve my simple pulse control. Half the fun of competing in the radio control event is meeting the other contestants and discussing and exchanging ideas with them; and believe me, the number of ideas was outstanding. Proof of the practicalness of these new ideas is the fact that not over three or four of the thirty-one entries got out of control. This is really some record when you consider that nearly half of the 17 entries in 1948 went out of control.

One thing I wanted to incorporate in the new pulse control model was a second control, preferably for two-speed motor operation. The single control I was using for rudder suited me fine, but I desired also to vary the speed of the engine. I considered installing a second receiver in the plane and using a second transmitter on the ground. On advice of such well-known radio control pilots as Good, Foxworthy, Hughes, and Brown, I discarded this idea as being impractical. It is virtually impossible to operate two receivers simultaneously on the 50-54 mc. band without interaction. By using some of the ideas I picked up at the Nationals, and using a few of my own, I was able to develop a really practical second control. As I stated before, I desired two-speed motor operation and this second control works out fine as such, but it can also be applied to elevator control, parachute dropping, bomb dropping (for the Navy's new 1950 Nationals events) etc. Another goal was to do away with the necessity of winding a long rubber motor for the control system, before every flight. I am happy to say that this inconvenience is also very successfully overcome.

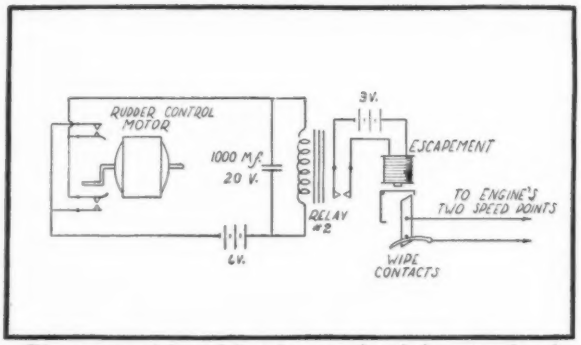
First, a short review of my original pulse control unit as described in my article in July '49, M.A.N. This will acquaint the reader with how the system works. I will go on from there to describe the improvements I have made on it.

The signal from the transmitter is pulsed on and off at the rate of one or two pulses a second. This pulsing is done by an HO gauge train motor and gear train operating a micro switch, the speed of which is controlled by a power rheostat. This signal can be held on steadily or turned off completely by means of a three-position toggle switch. Thus the center or neutral position of the toggle switch allows a pulsed signal to be sent from the transmitter. Turn the toggle right and a steady signal is sent out. Turn the toggle left and no signal is sent out. In the airplane the signal is received by the radio receiver and causes the escapement in the tail to be activated and de-activated at the rate of one or two times a second. The escapement is modified so that during signal-on, the rudder is in right, and with signal-off the rudder is in left position. When the rudder is turning right and left one or two times a second the plane flies straight. When the toggle switch on the transmitter is turned right and a steady signal is sent out, the escapement in the plane is activated, causing right rudder and the plane goes right. When the switch is turned left, no signal is sent out, the escapement in the plane is de-activated, causing left rudder and the plane goes left. Thus the plane follows exactly the positions of the toggle switch and cannot get out of sequence.

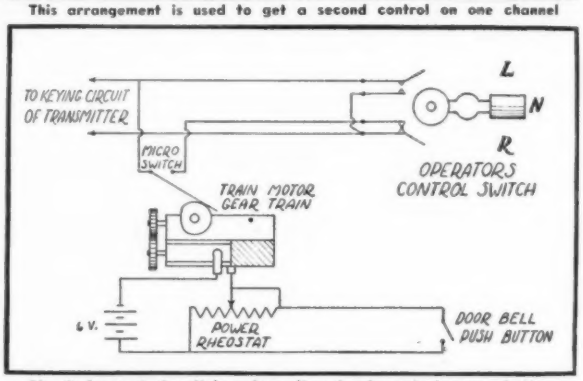
Eliminating the escapement proved to be very simple. It was one of those things that are so simple they are overlooked and thus appear difficult. I merely replaced the escapement with a small reversible D.C. motor. Of course an addition had to be made to the motor to make it practical; I put a small crank on the motor shaft, similar to those on an escapement. Now I ran into the same problem that I had so many times before; how to stop the motor in full left or right position.

(*Turn to page* 38)

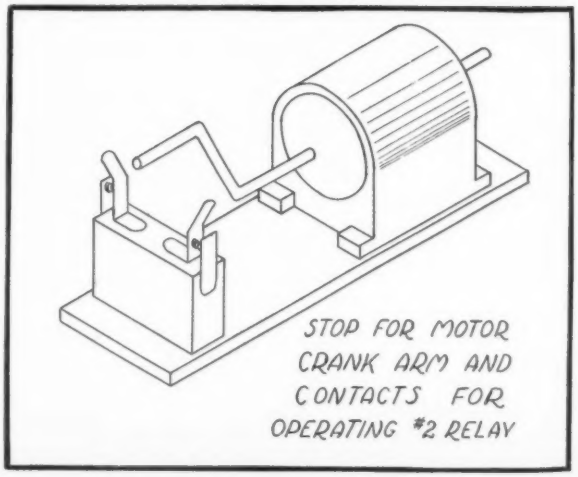
The author with his modified *Rudder Bug*

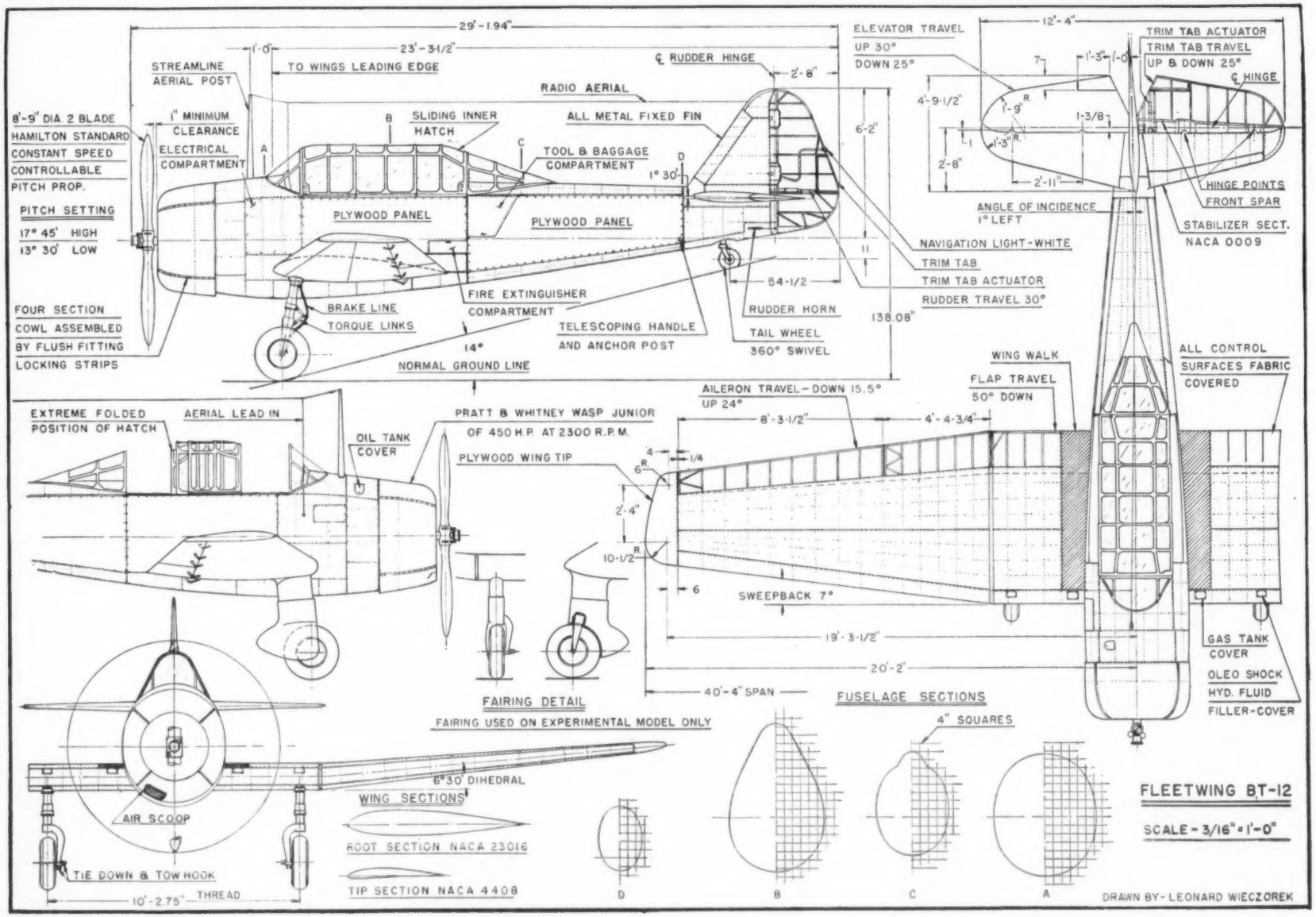


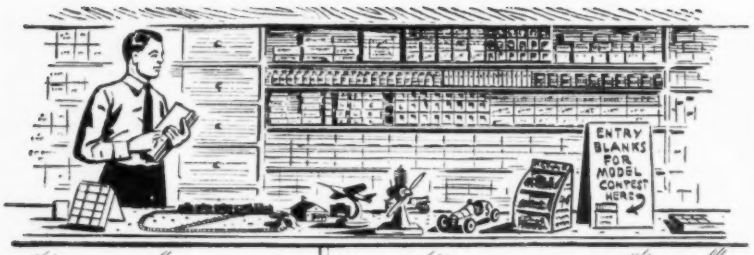
This arrangement is used to get a second control on one channel



Circuit for control switch, pulse unit and pulse rate increase button.




29'-1.94"
1'-0"
23'-3 1/2"
TO WINGS LEADING EDGE
STREAMLINE AERIAL POST
℄ RUDDER HINGE
2'-8"
RADIO AERIAL
ALL METAL FIXED FIN
6'-2"
8'-9" DIA. 2 BLADE HAMILTON STANDARD CONSTANT SPEED CONTROLLABLE PITCH PROP.
1" MINIMUM CLEARANCE
ELECTRICAL COMPARTMENT
SLIDING INNER HATCH
TOOL & BAGGAGE COMPARTMENT
1° 30'
PITCH SETTING
17° 45' HIGH
13° 30' LOW
PLYWOOD PANEL
PLYWOOD PANEL
54-1/2
FOUR SECTION COWL ASSEMBLED BY FLUSH FITTING LOCKING STRIPS
BRAKE LINE
TORQUE LINKS
FIRE EXTINGUISHER COMPARTMENT
TELESCOPING HANDLE AND ANCHOR POST
RUDDER HORN
TAIL WHEEL 360° SWIVEL
14°
NORMAL GROUND LINE
138.08"
ELEVATOR TRAVEL
UP 30°
DOWN 25°
NAVIGATION LIGHT-WHITE
TRIM TAB
TRIM TAB ACTUATOR
RUDDER TRAVEL 30°
12'-4"
TRIM TAB ACTUATOR
TRIM TAB TRAVEL
UP & DOWN 25°
℄ HINGE
4'-9 1/2"
1'-9" R
1'-3" R
2'-8"
2'-11"
ANGLE OF INCIDENCE
1° LEFT
HINGE POINTS FRONT SPAR
STABILIZER SECT. NACA 0009
EXTREME FOLDED POSITION OF HATCH
AERIAL LEAD IN
OIL TANK COVER
PRATT & WHITNEY WASP JUNIOR OF 450 H.P. AT 2300 R.P.M.
PLYWOOD WING TIP
AILERON TRAVEL-DOWN 15.5° UP 24°
WING WALK
FLAP TRAVEL 50° DOWN
ALL CONTROL SURFACES FABRIC COVERED
8'-3 1/2"
4'-4 3/4"
2'-4"
10-1/2" R
SWEEPBACK 7°
19'-3 1/2"
20'-2"
40'-4" SPAN
GAS TANK COVER
OLEO SHOCK
HYD. FLUID
FILLER-COVER
FAIRING DETAIL
FAIRING USED ON EXPERIMENTAL MODEL ONLY
FUSELAGE SECTIONS
4" SQUARES
6°30' DIHEDRAL
WING SECTIONS
AIR SCOOP
TIE DOWN & TOW HOOK
10'-2.75" THREAD
ROOT SECTION NACA 23016
TIP SECTION NACA 4408
D
B
C
A
FLEETWING BT-12
SCALE - 3/16" • 1'-0"
DRAWN BY - LEONARD WIECZOREK



HOBBY COUNTER

Conducted by THE TRADE OBSERVER

"WHAT'S the story behind the *Cumulus?*" your Trade Observer asked Carl Goldberg, *American Hobby Specialties* (2635-45 S. Wabash Ave., Chicago 16, Ill.). "MODEL AIRPLANE NEWS readers would like to know when they can get one." The *Cumulus*, as you know, has come to be the big topic of discussion since the baby-engine novelty wore off. Because the ship had been advertised but kits had not appeared on the shelf, rumors have been thick, especially since a *Cumulus* was flown at the Nationals last year.

"Last May," Mr. G. told us, "we had plans well enough along on the new *Cumulus* so that it seemed probable kits would be delivered in six weeks. Since the Nationals were coming up, the firm expected to rush this number and therefore scheduled the advertising for the kit to break at the expected delivery date. But then delivery of important items to us that had been promised for June weren't made until October. There were unexpected die difficulties, and so on. It looks now as if the kits will be completed shortly; we are down to two problems with solutions for each. Actually, deliveries could have been made had we been willing to sacrifice quality."

Hot off the griddle is the news that this firm is readying an all-balsa pre-fabricated cabin model for ½A engines, which is *both* free flight and control. This time little is being said, although your Observer has learned one of the test models was lost last summer (despite being a sport model) and that the ship is said to loop nicely on lines. Another useful tip to small engine owners is the company's experience that the 7/6 *Power Prop* (presumably the same figures apply to various makes) is doing a good job for .099's in both free flight and stunt. Small *Power Props* (at 20c for less than 6") are 5½/3, 5½/4, 5½/5, 6/4, 6/5, 6/6; *Top Flites*, 6/3, 6/4, 6/5.

* * *

It was bound to happen! Sooner or later someone was bound to include a baby gas engine in one of those ready-to-fly deals. *Grant Products Corp.* (2900 E. 11th St., Los Angeles 23, Calif.) did just that and a "leetle" more to boot. For $7.95 they are offering a well-thought-out item consisting of a 12⅜" profile Wittman *Buster*, a *K & B Torp Jr.* engine, with special gas tank, prop and pulley arrangement for easy starting. Model is flown by company's special "G-control", a single line that runs from short stick held in hand through loop on leading edge of wing. Both the construction method and the G-control system are fully protected by patents. One thing is for sure: Grant Products *Buster* is a block buster of the first magnitude. One has only to add up the cost of a *Torp Jr.* and the other items to figure the actual cost of a plane that flies when unpacked, with no assembly. Yes, this ready-to-fly trend will be great for modelers!

* * *

Berkeley Models (142 Greenpoint Ave., Brooklyn 22, N.Y.) sends us special news about three of their latest models, *Swisher*, *Mini-Zilch* and *T-28 Trainer* Kit. The *Swisher* is a ready-to-fly *Jetex*-powered model, complete with engine and fuel and retails for $1.95. It was designed by former Nats. champ, Henry Struck. The *Mini-Zilch* is a ½A stunt controliner that won three firsts and a second place in four stunt contests held at Navy Pier, Chicago World Hobby Exposition. Model was powered by *K & B Torp Jr.* The *T-28 Trainer* Kit is being readied for appearance in May. It is a detailed scale controliner of the new standard trainer for the USAF.

* * *

Late info from Dick Schumacher, *Model Aero Engineering Co.*, (Box 536, Reseda, Calif.) lists these *Maeco* developments: a 4 c.c. universal tank to fit the demands of the simple profile jobs that are showing up for ½A. Brass, of new and smart shape, these profile tanks are thought by *Maeco* to be the lightest available for their displacement. Those 4 c.c.'s mean about a two-minute run on a *Cub* or *Baby Spitfire*. Coming soon are transparent plastic tanks for sport fliers, in appropriate sizes for .05's and .09's, allowing for 30-second engine runs with enough added volume for starting and tuning. Start engine, watch fuel level, and release when proper amount is left.

English *Elmic* timer, a lightweight precision timer with real snap action and movement designed for dethermalizer action as well, originally introduced at $2.50 in this country by *Maeco*, now sells for $1.85. Lightweight of 1/3 oz. makes the *Elmic* of interest for rubber models where gadgets usually impose overload handicaps (as on Wakefields). On new *Elmics*, light shafts have been replaced with thicker-walled tubing. Builders have tumbled to the fact that you can drill a hole, closer in than formerly on the D.T. arm. Since the usual 1/2" movement is not needed to work a dethermalizer, a 1/8" movement provides a 400% increase of action force. *Maeco* also coming out with special hot-fuelproof line, a semi-transparent rubber that remains flexible indefinitely but enables you to see what is going on.

* * *

For the first time in the history of model aviation, actual participation figures are available with standard trophies from *Sparky Specialties, Inc.*, (485 Milwaukee Ave., Chicago 10, Ill.). Thus the controline flier may expect to win a trophy which shows what he did on the contest field. Also being announced is a special airplane figure, the first designed and produced (according to the manufacturer) for model airplane trophies, and a special race car figure for car addicts. Interested clubs should write direct.

* * *

If you get to New York, try the Green Door at 203 E. 15th St.; one flight up there's a sign that will make you feel good. "Through this door passes the world's best model builders," it reads. Inside you will find *Jasco*, most of the Zaics, and usually Frank Ehling. Interviewing John Zaic your Trade Observer inspected originals of new ships now hitting the market. Most un-

usual is the *Junior Phoenix*, 36", $2.25, for .099 engines; it features the new jacknife landing gear which props up the nose like a rocket ready to take off. *Thermal Traveler*, 36" stick at $1.50 and *Thermal Cruiser*, cabin at same price, are among the simplest rubber jobs yet designed. Ehling no-spar influence carries over in wide-edged sparless wings. Fuselages are boxes with wings strapped on direct. New *Jasco Jet 100* at 80c is a rakish-looking high-pylon mounted jet with shoulder wing. Power pod position was found best for anti-spin after dozens of test ships. Split nose block design and hingeless folding props (in kits) are among rubber developments that simplify toughest of construction problems.

* * *

Though the item was briefly mentioned last month, the Observer has now had a chance to inspect and use one of those *Spitfire* (Mel Anderson Mfg. Co., 1819 Third Ave., Los Angeles 6, Calif.) flight timers. This 29/100-ounce timer is a must for free flighters; well worth the $1.95 tag. Unit is good looking, sturdy, very compact, action is positive. Two features are the stop which holds arm out until released at moment of launch, and the set screw for adjustment which is out of the way on inner end of timer body. This screw is reached through small adjustment hole provided in other side of fuselage, prevents oily fingers, etc., fouling up the works. Flight timer is easily installed even in small craft since cut-out is minimized. If you go bug-house attaching leads to your baby engine, removing same, tuning hard-to-get-at needle valves, you can make life easier by installing those Anderson plugs *(Spitfire Glow Plugs)* which have a clip combining both positive and negative. Plug is 49c; connector 15c.

* * *

A sensation of the recent Model Industry Association trade show in Chicago was *Victor Stanzel's*, (Schulenburg, Texas), announcement of Mono-Line, which transmits torsional force from the control handle to operate the elevators via a simple control mechanism on the plane. The control handle points at the plane and is held in one hand while the other hand works a sliding knob which causes the single line to twist. Extraordinary advantages of this system include elimination of the old slack-lines bugaboo since *Mono-Line* operates with line loose as well as taut. Thus when wind moves model in, bowing lines, control is not lost immediately.

First of the *Mono-Line* control units is designed for Class A and ½A models. Especially created for use with the *Mono-Line* system is the same company's *Tuffy*, a 24-inch ½A and A sport model, with all parts ready-formed for quick assembly. Oldtimers who like their circles to come slowly say that they can fly *Mono-Line* well at 100-foot length, since high centrifugal force is not needed for taut lines to insure control.

* * *

This month *Enterprise*, (5107 Ave. D, Brooklyn 3, N.Y.), invaded the low-price flying field with a big splash in form of four 50-cent numbers: Piper *Cub Special*, *Monocoupe*, *Taylorcraft*, and *Aeronca Champion*. Fuselage sides, etc., are not only die cut but color printed as well. Praiseworthy job is done on the wings, which are one-piece, cambered, with dihedral, and color-printed on both sides with license numbers appearing as well. Since dihedral always is stumbling block to kids, this development adds to appeal of these half-dollar numbers. Contest builders and club leaders will find that *Enterprise* fliers (also Monogram, Comet, etc.) are swell for small contests where everybody builds same airplane. Fun for expert, good for beginner. Complete with plastic prop, formed wire parts, rubber wheels, etc.

Jerry Brofman, proprietor, enthusiastic over new *Baby Era Bipe*, 16-inch version of *Baby Era*, complete with special *GloFlo* stunt tank designed for engines of .045 to .099. Capable of most stunts, including inverted flight, prefabricated, at $2.50.

* * *

RANDOM NOTES: Ray Matthews, prominent

Oklahoma free-flighter reported to have sold his *Tarfu* design to Wally Simmers, *Midwest Model Aircraft* (Chicago 21, Ill.) . . . Married modelers and school boys, threatened with extinction for building nothing but airplanes, are having fun with those antique autos, according to many dealers. A. J. Koveleski, *Scranton Hobby Center* (315 Adams Ave., Scranton 10, Pa.) told your observer that the 1900 Packard roadster (Hudson Miniatures), at $2.50 was designed from the actual car, owned by singer James Melton who cooperated in preparation of kit. Still later horseless carriages by same company include early Cadillacs and Buicks, the Stutz *Bearcat* and Mercer *Raceabout* . . . *Consolidated Model Engineering*, (3087 Third Ave., New York 56, N.Y.), also has Class B *Hell Razor* for *Dooling 29*, with metal bottom—speed fans please note! . . . Boat fans pick up one of those leaflets by *Marine Model Co., Inc.*, (Halesite, N.Y.); also a 68-page catalogue of boats, boat info, and over 600 finished fittings, etc., for 35c . . . Train fans: extraordinary HO scale accessories by *Dyna-Model Products Co.* (76 South St., Oyster Bay, N.Y.) include all manner of realistic objects . . . As you leave, note counter display card of *Duncan Craftsman* (Atlantic, Crawford Co., Pa.) wrenches. At 65c the set, they fit all mounting nuts, ignition and fuel line nuts as well as V-2 and V-3 glow and spark plugs!

Scrap Box

(*Continued from page* 1)

Flown by proxy fliers Jean Guillemard and Gabriel Martin, Dore and Curry's models placed 4th and 5th (Dore) and 6th (Curry). Since the boys flew as a two-man team, they won the "Challenge Inter-Club," an award given on a point basis. This was the first time that a two-man team ever won the trophy and it is the first time that it was ever awarded outside of France. "So the first American team to fly in the Coup d'Hiver did pretty well," thinks Henry. Nice going, Kentucky. (Why don't we hear more of important events like this?)

This reminds your "*Scrap Box*" custodian of so many things that he wants to go off in all directions at once! First, French models. A decade ago, at the last Wakefield held before the war (Bendix) proxy flier Hank Struck, fascinated with the glide of his French entrant's model ("It glides like a fiend!", said Henry) brought our attention to an unusually efficient airplane that appeared to violate what is considered good design practice. It had a diamond fuselage with wing mounted parasol fashion on a thin sheet-balsa pylon. A single strut on each side supported the wing. And it had lots of sweepback. To be sure, the prop was a free-wheeler and the two-wheel gear was fixed. Plenty of drag but, man-oh-man, it sure did glide! And then there is this business of total weight/power-weight ratio. As Dore suggests, just how well does it pay to go into long motors and excess weight?

Wakefield motor length runs two and three times the distance between hooks but our ships invariably come in at 9, 9½, 10, even 11 oz. What do we pay in terms of glide? If such a model will have a glide/power ratio of 3:1, a run of 45 sec. would get you a 3-min. total flight; a 1-min. motor run, a 4-min. flight. How come, then, that 3 min. on 45 sec. is fairly easy, but that the addition of enough rubber length to get you 60 sec. of power leaves you short of 4 min.? Isn't there a corresponding increase of altitude for that 15 sec. additional power run, or does the extra weight of the rubber give a lead-footed glide? (This reminds us of Alvie Dague and Roy Wriston, Tulas—remember? Ships that exploded skyward like ruffled grouse!) Hal Roth planted this thought with an account of how he tried to improve his Wakefield's duration by lengthening the rubber—the duration fell off!! If this suggests shorter motors, perhaps of higher power; consider reports of those rubber jobs from L.A., which have no tensioners, use, therefore short motor lengths, yet get very high. The boys out there also are going in for thin gumwood hubs of ¼" x ⅝" x 2", about one half the balsa hub measurements.

"Maybe you'll print this and maybe you won't," wonders Keith Monnier, Algonac, Michigan, an outspoken builder of 14 years experience. Don't worry, Keith, you're on, and we'll defend your right to say it!

"After reading what Harry Copeland had to say about the beginner, I decided to flip my wrapper," begins the man from Michigan. "Statistics are fine but, in my opinion the reason for the beginner's not starting or keeping on, is the cost of things. Just to mention a few: fuel, 75-80c a pint, props 35c apiece, good kits, $4 to $7. The guy with a small income just can't pay those prices and still live. (Don't get the wrong idea, men, the entire cost of living is sky high today and models are in the same boat.)

"You go to a contest and what do you see?" asks Monnier. "A bunch of guys in their late 20's and 30's. You might see a junior or senior but he gets left in the dust by the experts. So maybe the younger crowd haven't put in an appearance at contests held just for them, but why not keep it up, spend much more time with the younger boys, and spend as much for their meets as on regular contests and you'll have younger contestants.

"In my opinion the rules are all wet. Free flights haven't changed since the *Zipper* when I was in knee pants. There are exceptions but 99% of the models have a wing hung on a paper thin pylon, with a broom stick fuselage, and an invisible wire coming down to hold the wheel on. So everybody hand launches. It's so much easier. The best thing that has happened is the PAA-Load event, but that is all. Jim Walker suggested precision. Give that to the R.C. boys! U-control needs more than stunt, scale, speed. Best thing yet is team racing. People and contestants alike are tired of each person doing the same loops and eights and inverted flight. In speed the models take off with a moan and groan, then a scream, become a blur until the engine quits, then land on their bellies, no gear, bust a prop and that's it!

"One more thing," concludes Monnier. "Californians have more records but they have practically year round flying weather. I asked a man at the . . . factory why the Californians were ahead of us and he said, quote, 'because we are machinists out here.' Where did the auto industry start?"

Late in January, results of the AMA elections were announced. Kenneth Held, a Detroiter, is president and Frank Bushey, that energetic leader from Hartford, is secretary and treasurer. Held we met briefly through some committee work and found him a practical chap with his feet on the ground. Friend Frank B, we are sure, will do a job. We want to say something, too, in appreciation to C. O. Wright whose work over the past two years will set the example, rather the ideal, for all future chief officers to shoot for. There isn't anyone who came into contact with C. O. who isn't the better for the experience.

With all the beefing we hear about the poor old Academy it's about time someone emphasized its importance and its success. Bill Enyart, a member of the NAA Board of Governors, in making an analysis of the problems of the National Aeronautic Association, $14,000 in the red for the year, commented at length on: "The Lesson to be Learned From the NAA's Model Academy." Here, for the record, is the impressive job AMA members have been doing.

"Success story: The AMA is a story of success within NAA which has largely been ignored down through the years (by key NAA leaders he explains elsewhere)," comments Bill Enyart. "Before the Academy was established within NAA the junior membership phase of NAA's operation was weak, confused, costly, ineffective . . . the AMA was both an operating and a financial success from its year of inception . . .

"It is on the financial score, however, that the record of the Academy as compared with the record of its parent is most devastating and illuminating. Whereas the parent body has a history fraught with red ink, the AMA, the almost unknown and unnoticed 'junior,' 'educational,' phase of NAA has always paid its own way and in fact has in part carried Senior NAA on its back

by carrying a 'share' of NAA's expensive 'overhead' costs. For the year 1949, almost 1/3 of the entire 'expenses' of NAA were Academy expenses and well over 1/3 of all NAA revenue came from model builders and fliers. Whereas the Academy as such was in the black for the year the NAA as a whole was badly in the red." Thanks Bill Enyart for this report.

Any discussion of the NAA-AMA setup gets around to the pros and cons of the new AMA constitution proposed last year at Olathe. One very important point in the proposed constitution was a provision by which AMA, if it so desired, could become fully independent of NAA. While this is merely common sense insurance against the unknown future, too many rashly have jumped to the conclusion that the AMA wants independence now. It cannot be demonstrated that the AMA is capable of successful operation of its own affairs. All that leaders want is the above provision in the constitution. That this is entirely in order from both the AMA and the NAA point of view is seen in the fact that Bob Phelps, Executive Vice President, NAA, who sits in our executive council meetings at the Nationals each year, saw no reason why we should not so revise our constitution.

Later, at Detroit, the new constitution became a cropper when discussion revolved around the "how-many-angels-can-stand-on-the-head-of-a-pin" point that we should decide if we were *prepared* to run the AMA on our own. Actually, the inclusion of this point in the constitution will only reassure the modelers and, if anything, get us more attention from mother NAA. With no objection from NAA voiced at Olathe, there is no reason why a proper constitution should not be adopted at Dallas.

In keeping with all this brain work, here's an appropriate yarn from Bob Buragas, East Orange, New Jersey. How about you telling it, Bob?

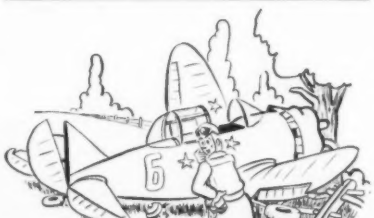
"Floating on a weak riser the little ½A job just wouldn't come down." Bob begins. "We swore we were getting old. A measly half mile of running and we were winded. Our legs dragged. At last, a short distance off, the ship started to sink. With a sigh of relief, the run turned into a walk. Take a line on that tree, a little to the left and behind it, and there it will be. Next time we'll use a shorter engine run when it's test flown. Finally we are there, but no model!

"Then started the inquiry of people in the neighborhood. It seemed hopeless as all answered, 'Never saw one.' We walk up to a woman dusting a rug. 'Have you seen a small gas model airplane go by?' 'Why no,' she answered, 'when did it go by?'

" 'Over those trees, just a few minutes ago,' we answered in despair, 'been chasing it for about a mile now.' So she looked at us cheerfully and said, 'You know, it's a good thing you weren't in it or they'd still be looking for you!' "

How about a simple one? A smart modeler stood watching two guys wind a rubber job. Heels dug in, the rubber stretched and stretched. Rubber lube glistened in the sun as the knots piled up. Said the smart modeler, "Gee, that rubber shines. Didja dope it?"

Thanks, Bob Buragas, for the stories. Either way you win the subscription to MODEL AIRPLANE NEWS for the best tall but true story of the month.



"Heck of a field to fly in, ain't it, Mister?"

Add 10 Miles to Your Speed

(*Continued from page 15*)

weather was moderately cool and overcast. He varied the standard *1000* fuel mixture by adding one ounce of nitromethane to a pint. After making this slight change, Lew cracked the record with a speed of 150.63 mph. At record trials held in Long Beach on December 11th, Lew flew his Class D job to a new record with a speed of 157.83 mph. The day was cold and clear with about a fifteen mile an hour wind. This time he did not have to vary his stock fuel mixture one iota. If you will analyze the above fuel variations in respect to the weather conditions it may be a guide to you. Lew emphasizes it is very important that your standard fuel mixture contain 25% Bakers AA castor oil, 25% nitro-methane, and 50% methanol. If you are unable to obtain a prepared fuel of this formula, he suggests that you mix your own. Finally, bear in mind it is the exception rather than the rule that you will have to alter your standard fuel mixtures. Also, these variations must be made with caution. Do not work on the basis that if a little will do some good, a lot will do better; your variations must be made gradually.

So far we have covered plane design, engines, and fuels. Next month we will go into detail on propellers, test flying, and contest flying. I know that the old-timers in this business of speed, as well as the beginners, will be interested in the new and novel design of Lew's props. This new design has given him from 5 to 8 extra miles per hour over former prop designs. Next month you will receive full detail drawings on this design. Until then more speed to you and happy landings.

Flyabout

(*Continued from page 27*)

blade and some kind of straight edge. Do not shape at this time. The leading edge is 1/2" square from tip to tip. Both left and right panels are built separately, then joined in the middle at the proper dihedral by filling in with short pieces of edging and the remaining ribs.

Make 23 full size wing ribs; then, having pinned down the edges on the wing plans, begin to fit ribs. Cut off the rear of each rib going toward the tip as seen on the detail (part of side view). The tips consist of 3/32" sheet, reinforced with 1/16" sheet gussets; inside the last rib, 1/8" sheet gussets strengthen the corners.

When both panels are dry, attach them to the bench with the tips supported for dihedral and fill in the center section. Leave out the center three ribs until the edging joints have dried, then add the joiners, and finally the ribs. Short lengths of 1/8" square join the center three ribs at the top. Trim and sand the edges.

To cover use one piece of rubber model tissue (yellow) for the entire bottom of the wing and three pieces for the top, one for the center section, and the others for the left and right panels.

Water spray the wing and when dry, give two coats of dope which has been thinned half and half with thinner. Finish off with a third coat of the same but with three drops of castor oil added per ounce of dope. This will stop further shrinkage and prevent warping. Don't forget to coat at least the forward part of the fuselage with fuel-proofer.

FLYING. Since it is a cabin model, the *Flyabout* tends to turn left under power. Flying depends on what you want the model to do. Slight right rudder would give a circling glide, yet make the model go straight across country under power. If right-thrust is added by inserting a washer behind the left side of the motor mounting, between crankcase and firewall, the model would fly straight at all times. By adding slight left-thrust and a goodly amount of right rudder, glide would be tight right and the power circle slight right.

Otherwise, flying is the usual procedure of hand-gliding, then adding incidence under the leading edge of the wing to correct nose-heaviness. For slight tail-heaviness, add a total of no more than 1/16" sheet shims under the trailing edge of the wing; if more than that is required to achieve a good glide, put lead ballast in the nose.

The original model flew well with a *Chapman* 6-4 prop, and heavy rubber-tired control model type wheels.

Report From the West

(*Continued from page 8*)

people have become interested in free flight because of the development of the 1/2A engines. The *Aeroneers* have their field, on Kearney Mesa; a lot of old-timers have lately been seen out flying who haven't been heard from for years, many of them flying *Baby Zephers*. Incidentally, among the *Zephyr* fliers was a young man by the name of Dennis Davis. He remarked that it was his first kit job in six years. Radio control flying has advanced to quite a popular position around San Diego. E. J. Brown has been putting his *Arden .19* R.C. job through an acrobatic pattern thought impossible with only rudder control.

Dick Everett, Ernie Wrisley and George Wagner have been putting in a lot of indoor time in the gym at Gillespie Field, San Diego. The gym is only 60' x 60' with a 40-foot ceiling and, of course, lots of drafts, so 7 or 8 min. is tops. Dick Everett is a hard man to beat—his outdoor rubber jobs have that little extra something that makes them tough competition. We noticed the stabilizer was rather large on Dick's latest creation, so asked, "What percentage stabilizer are you using?" The answer "80%"! Everett moved to San Diego from NACA at Hampton, Va., about three years ago, and he is sold on our way of modeling. He says, "- - - - - - - - -!" (On second thought maybe we had better not quote him.)

Talked to Jim Saftig who told us that the *San Diego Airliners* were back in business. This club and the *La Mesa Airfoilers* had a challenge meet February 19. There is a perpetual trophy that will be the property of the club which is the first to win it three times. They have scheduled four meets this year. On Feb. 19, the *Airliners* took the trophy with 2,055 pts. to the *Airfoilers* 1,958. The individual winners were: *Stunt Open Expert*—1. Jim Saftig; 2. John Slater; 3. Merv Becker. *Stunt Open Beginner*—1. George Peck; 2. Roy LeMaster; 3. R. J. Laanen. *Stunt Sr. Advanced*—1. Gene Marshal; 2. Larry Goodale. *Stunt Sr. Novice*—1. Jim Sipsett; 2. Wayne Slusser. *Stunt Jr. Advanced*—1. Dennis Alfred. *Stunt Jr. Novice*—1. Bob Frazier; 2. Jerry Miller; 3. Robert Bourke. *100-Lap Goodyear Race*—1. George Barker; 2. Merv Becker; 3. Cliff Potts. *100-Lap Open Race*—John Slater. *Team Stunt*—1. George Peck & Cliff Potts; 2. G. Marshall, M. Becker, J. Slater. The outstanding contestant of the meet was seven-year-old Dennis Alfred who really put his plane through its paces. The new officers of the *Airliners* are president, Cliff Potts; secretary, Harold Ledington; treasurer, R. J. Laanen.

We have a little note of interest about the *Sky Kings Model Airplane Club* of the Los Angeles area. For the new term they elected the following officers: Joe Carpenter, president; F. H. Winters, vice president; Mary Murphy, secretary; Arthur J. Antrim, treasurer, and Don Anderson, senior advisor. The club decided to sponsor a worthy boy each year as a member of the club. This sponsorship includes his club dues and his AMA license fee for the year. The boy must be one who is outstanding in ability, and interested in flying, as well as a good student in school. They chose Johnny Huber, of Redondo Beach, as their "Boy of 1950." He has proved his ability and interest to all of the members of the club, and has the quality of excellent sportsmanship. The club's sponsor, the *Hughes Employees Association*, is now in the process of creating a new recreation area, in which they have been apportioned space for several flying circles. At the present time the *Sky Kings* are planning their Second Annual Meet to be held at the end of this summer. This is a fine club with fine sponsors—lots of success to them.

All able-abodied free flighters should be on hand for two of the biggest free flight meets in 1950, to be held in San Diego and in Bakersfield, Calif. The 12th Annual *Bakersfield Gas Model Airplane Association* Meet will be held at Famos Airfield, 23 miles north of Bakersfield, on Highway 99, April 16. The meet is AMA sanctioned and will begin at 9 a.m. The winners in the 1/2 A, A, B, and C gas events will be awarded trophies and merchandise, the trophies running all the way to fifth place. There will even be a Junior trophy in addition to the Sweepstakes Trophy.

The *San Diego Aeroneers* will hold their 19th Annual Western States Free Flight Championship Contest on April 30. The meet will start at eight in the morning at the *Aeroneers'* field, one-half mile east of Gibb's Airport on State Highway 395. Trophies to third place in each class (1/2A, A, B, and C) plus Junior trophies to third, and a High Point Sweepstakes award will really draw a crowd to this fine meet. The *Aeroneers* have always put on a splendid contest, and this year Jim Saftig, who will serve as contest director for the AMA sanctioned meet, promises to uphold the tradition.

That about takes care of things up to now . . . we'll see you next issue.

PHOTO CREDITS

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Improved Pulse System

(*Continued from page 30*)

Then the simple solution came to me. I merely mounted a block of wood so it would stop the motor crank in full right and left position. Thus the motor could turn only 180° each way. The current a D.C. motor draws, when it is locked so it cannot move, is fairly high and I was afraid the battery drain might be excessive, but I have found through experience with this system that I don't have to change batteries any oftener than I did with an escapement.

One of the troubles encountered by many radio control fliers, when using an electric motor for control purposes, is that the motor transmits a signal to the receiver, thus keeping the relay closed. These small D.C. motors do transmit a weak radio-frequency signal that will actuate the receiver if the two are placed adjacent. The easiest solution is to place the motor as far from the receiver in the plane as is practically possible. I have mine mounted about half way between the receiver and the tail of the plane and have never encountered any trouble from this source.

After eliminating the objectionable necessity of winding a long rubber motor before every flight, I set to work to incorporate a second control. I first tried an inductance method similar to the one described by George Trammell in his article in July, 1947, M.A.N. I had fair luck with this system but it wasn't exactly what I wanted because the relay setting was too critical and a small decrease in battery voltage resulted in the necessity of readjusting the relay.

The method which I finally worked out and the one which I am using at present with very good results, is a capacitive circuit. The relay setting is not at all critical, because the current is either on or off, and thus the relay does not operate on a change in the amount of current, as in other control systems. The relay I use is one sold in all model shops for remotely controlling the engine speed on U-control models; it is mounted on a piece of sponge rubber in the plane to prevent motor vibration from affecting it. This relay should not be confused with the sensitive relay on the receiver. It is a separate unit that is used only to operate a second control. To prevent further confusion with the receiver relay I will refer to this second relay from now on as relay No. 2.

A 1000 mf. 20 V. capacitor is hooked in parallel with the winding of the relay No. 2. When a voltage is applied to this winding it not only activates the No. 2 relay but also charges the capacitor. If the activating voltage is removed from the No. 2 relay, the charge in the capacitor will keep the relay activated for about three seconds. The pulses sent by the transmitter are at a rate of about one or two a second; thus if an activating voltage is applied to the No. 2 relay at every pulse it will remain activated because the charge in the capacitor keeps it operated between pulses.

I mounted a set of contacts on each side of the small electric motor that operates the rudder, so at every pulse right and every pulse left these contacts are closed by the motor arm crank, sending a voltage to the No. 2 relay and capacitor. If the rudder is held in the right position, the right-hand contacts are held closed and the No. 2 relay remains operated. In full left rudder position, the left-hand contacts are held closed and the relay still remains operated. As long as the pulses are kept slow (about one or two a second) the motor arm will swing full right and full left thus sending an activating voltage pulse to this relay winding, keeping it activated. However, if the pulses are speeded up to between five and ten a second, the motor arm will not swing full right or left but will practically stand still in the middle. Since the contacts are only closed on full right or left, no activating voltage pulses will be sent to the No. 2 relay. It is only necessary to speed up the transmitter pulses for three seconds at the end of which time the capacitor across the No. 2 relay winding will discharge, and thus allow the relay to de-activate. The contacts will then close and operate any second control that is connected to them.

For speeding up the transmitter pulses I use a doorbell button connected across the power rheostat. Since the power rheostat controls the speed of the HO train motor, closing the doorbell button shunts out the rheostat, allowing the train motor to turn at full speed. Releasing the button causes the train motor to resume slow speed. The slower pulses again allow the rudder motor arm to swing full right and left closing the contacts and activating the No. 2 relay. Thus every time the button is depressed for three seconds, the second control is operated.

This system works fine for glider release, bomb dropping or the like, but does not work out too well for two-speed motor control without further additions. The reason is that if the No. 2 relay contacts were connected to the airplane engine's two-speed points, the engine would go into low speed every time the bell button was depressed, and immediately return to high speed when the button was released. A better method would be to have the airplane engine go into low speed when the button was depressed and released, and stay in low speed until the button was depressed and released again. To get the control system to do this, I connected a rubber-powered escapement across the No. 2 relay contacts. Every time these contacts are closed the escapement operates once. A wipe contact is mounted on the escapement arm so that it closes the points in one position and breaks them in the other. Now when you depress the doorbell button once for three seconds and release it, the escapement operates and closes the wipe contacts which are connected to the two-speed points. The engine goes into low speed. Depress the button again for three seconds and release it. The escapement operates again, opening the wipe contacts and the airplane engine goes into high speed.

This system is light and simple and easily constructed; any average modeler can make it. I have mine mounted in a small modified version of the *Rudder Bug* (May and June, 1949, M.A.N.) and the whole plane, equipment and all, only weighs 5-1/2 lbs.

I have used two types of D.C. motors for the rudder control. One is the small D.C. motor sold by Control Research and the other is one of the small plastic motors carried by most model shops. Both have worked out equally well. My radio equipment is "Good Brothers" throughout and the plane is powered with a K and B *Torpedo 29*.

We fly every evening and all day Saturday and Sunday, if the weather permits. Two other fellows I know have built up and are using this same system with equally good results. Try it yourself, I'm sure you'll like it.

Some kid from the States. Says his timer stuck.

Design Forum

(*Continued from page* 13)

stabilizer with its area equal to about 25% of the wing area. The model was carefully wound and launched. Under the anxious gaze of our young designer, the model climbed slowly but fairly steadily, flew several hundred feet and landed. Other test flights were made immediately to eliminate the possibility of the first one being a "lucky" flight. Stability was improved tremendously but still the model was a little critical. Precise and careful adjustments were necessary to fly the model. This was all right for the *experts*, but what about the *beginners* who would buy these models in the store. They knew little or nothing about models or how to adjust them. The inexperienced customer would take them out of the box, assemble them carelessly, wind them up and launch them with the expectation of a miracle. It became obvious then that either this stability problem had to be licked for good or the manufacturer would lose his investment and, incidentally, the reputation of our young designer would vanish into thin air.

Obviously, the addition of stabilizer area improved the flight but this plane was a biplane and addition of still more area would result in such a large stabilizer that the plane would appear like some freak without sales appeal, as in line C, Fig. 1. In fact the stabilizer would be nearly as large as one of the biplane wings. After a few sleepless nights of struggling with this problem, another possible solution presented itself. Our young designer reasoned that a curved surface is more efficient and gives greater lift than a flat surface of equal area. Why not try a cambered stabilizer, with a section shown in Fig. 2. (Same section as the wing.)

The dew had hardly vanished under the morning sun before a new test model with a *cambered stabilizer* of 25% of the wing area and set at –3° angle-of-attack, was ready to launch. The first successful flight was repeated; time after time the model climbed gracefully from the starting point, unwaveringly, recovering from air gusts and rolling out of banks imposed by a fairly sharp breeze. Even landings were something that a full scale pilot might be proud of. Had the problem been solved? The cambered stabilizer certainly did the job for this airplane but what about others? Would it work in this case and not in others? This type of stabilizer was quickly applied to other designs to be manufactured and results brought the greatest relief to both the designer and the manufacturer himself. Their planes soon were flying in every state in the union most successfully. This simple design feature had overcome the fundamental cause of unsuccessful flights with tractors.

Later toward the end of the 1920's when hundreds of fans became interested in tractor models, the application of this one idea brought success to many after they had attempted to design tractors with small stabilizers, without success. *Make the stabilizer area 1/3 of the wing area*, was the rule which made successful tractor flights possible at that time and which brought success to the young designer in 1919. This rule for *flat* stabilizers applies today. If cambered stabilizers of equal area are used, nearly 33% more stabilizing effect is obtained. So cambered stabilizers have to be made only 75% as large as flat stabilizers to obtain the same results. The rule, for minimum stabilizer area of the cambered type, is to make the area equal to 25% of the wing area. If stabilizer areas are less than these values, the model airplanes are apt to be critical and their flight erratic. This basic rule applies to tractors of average design with landing gears. Stick tractors with long noses extending far out in front of the main wing require much more stabilizer area, usually an amount equal to nearly 50% of the wing area, Fig. 3. To work out the exact area for all possible design conditions has taken considerable time and experimenting. However, after many years your "*Design Forum*" author worked out a formula that gives most successful results. This formula can be applied

not only to rubber jobs but also to gas models. It indicates the minimum stabilizer area that should be used on any model, as follows:

$$S_A = (0.2)\left[\frac{A(2C + N + D)}{M}\right]$$

In the formula S_A = minimum stabilizer area. A = wing area. C = wing chord or width. N = the distance from the center of the wing to the rear face of the propeller hub. D = the propeller diameter. M = the distance from the center of the wing to the center of the stabilizer; (see Fig. 3.). For an actual airplane with 60 sq. in. of wing area and other properly proportioned features it works out as follows:

$$S_A = 0.2\left[\frac{60(2(3) + 14.5 + 8)}{12}\right] = 0.2(5 \times 28.5)$$

= 28.5 sq. in.
28.5 = 47.6% of 60, or S_A = 47.6% of wing area.

This foregoing discussion has been Young, of 424 Ninth Street, N.W., Massillon, prompted chiefly by a letter from Andrew Ohio, in which he says, "I have not been building model planes for long, except the dime-store variety. I've been designing failures for the last two years, in the hand-launched glider and rubber-powered types." Other parts of Mr. Young's letter indicate that he has been unable to design successful models so far for lack of understanding of just a few fundamental principles, the chief one being the correct amount of stabilizer area for any plane. It has been found that many who are interested in aviation have been discouraged and lost to the game because their first model failed to fly.

There is no reason why a beginner's first model will not fly if the beginner will construct it with the proportions indicated in Fig. 3. (For further detail see Fig. 1, page 22, November, 1949, issue of M.A.N.) Make sure that it incorporates the following features:

1.) Stabilizer 1/3 or more of the wing area.

2.) Fin area equal to 10% to 12% of the wing area. (18% in stick models without landing gear).

3.) A stabilizer setting of zero degree angle-of-attack, parallel with the rubber motor.

4.) A wing angle of attack of 2½°. This is obtained by raising the leading edge of the wing ⅛" higher than the trailing edge, when the wing chord or wing width is 3". In the model, a ⅛" block should be cemented to the wing's upper surface at the trailing edge (assuming the wing is fastened *below* the stick) where it contacts the frame stick. This lowers the trailing edge, or in other words, the leading edge is ⅛" higher than the trailing edge. This provides a difference in angle between wing and stabilizer of 2½°, a feature that is most important if the airplane is to fly steadily without stalling, diving, etc. The broken lines in Fig. 3 indicate the proportions of a model without landing gear: the nose is longer so the stabilizer must be larger.

Make the wing out of balsa sheet, 1/16" thick. Cement a V block at the center of the wing after creasing it so each wing tip is raised approximately 2¼" above the wing center. Ribs 3/16" high should be cemented to the underside of the balsa sheet to give the proper wing curvature or camber. The frame stick should be ¼" sq. hard balsa, the tail surfaces 1/32" balsa sheet. The propeller is one of your big problems—best results are obtained with a propeller of 8" diameter and a pitch of 10 to 12". If you cut your propeller from an oblong block measuring 8" x 11/16" x 1-1/2", using the diagonal line method as shown in Fig. 4, you will have a propeller with proper proportions.

Begin by drawing diagonal lines from opposite corners of the block, (Fig. 4A) on both wide faces. Drill a hole through the block at their intersection, equal in diameter to the shaft that is to be used; 1/32" is advisable. A wire or pin may be used to make this hole instead of drilling. Cut away the block using the diagonal lines as guides.

The shaded portions may be cut away completely at first, leaving a blank with the diagonal lines forming the edges. Then cut away edge OA and OA′, forming a concave surface between lines OB, which is the propeller leading edge of one blade, and OD, the trailing edge of the same blade, Fig. 4B. Then also cut a face between OB′ and OD′, of the second blade. When this is done, cut away the back of the blade edge OC and OC′, thereby forming the convex face of each blade. The blades should be made fairly thick toward the hub and thinner toward the tips. At the tips they may be 1/16" thick.

When both blades are carved to the same thickness, sand off the faces carefully and then round the tip of each blade as indicated by the dotted lines, Fig. 4B. Finish the propeller by sanding carefully and balancing it on the pin through the shaft hole. If one blade is heavier than the other, it will drop when the propeller is suspended on the pin. With the pin horizontal, sand off the heaviest blade until the propeller remains at rest without turning.

If you are a beginner and wish to have a plane that flies without trouble, get to work on this model. With a reasonable amount of care in building it you will have some of the finest flights ever experienced. A model of this type has remained in the air as long as two minutes when wound with a winder. One especially light job, with 32" sheet for wings, remained aloft for 6 min. You will find that it is rugged and not easily broken. Try wings with 28" wingspan, they will give you even longer flights. Let us know your results. (AUTHOR'S NOTE: A model of this design is given in Fig. 1, page 22 of the November, 1949, issue of MODEL AIRPLANE NEWS.)

We have a few interesting questions from Edwin A. Durkee, 275375 North Western, Birmingham, Michigan. He says that at a recent contest he was impressed by the fact that most of the entrants planned that their models should climb nearly straight up, some of them made several loops on the way up, others stalled and frequently spun-in, also some of them spun directly from the launch. Of those that climbed nearly straight up, how much of the climb can be credited to wing lift and how much of it to the propeller thrust; in cases where the model stalled, was it a stall of the wing or of the propeller?

In most cases where planes climb nearly vertically, the climb is due almost entirely to propeller thrust. The climb induced by the wing is proportional to the vertical component of wing lift. Obviously, if a model is climbing vertically, the wing lift is horizontal and has no vertical component. From our experience we believe that a steady climbing angle of 45° gives maximum altitude. Loops, spirals, and other maneuvers obviously absorb valuable power that would be used more effectively if the model climbed straight and steadily. The reasons for these stalls and other wasteful maneuvers are first, improper design of the airplane and second, improper adjustment. It is most difficult to make pylon models climb absolutely straight and steady. Usually they spiral climb, because they are most often spirally unstable. Pylon models with the center of gravity above the thrust line also have greater tendency to stall than models with the center of gravity below the thrust line. Any one who has seen indoor models fly, will have noted and possibly been puzzled by the maneuvers in which a model climbs steadily, loses speed and then suddenly noses up sharply and tail slides. This is due to the fact primarily that the center of wing is above the thrust line and produces a sharp stalling couple when the plane is nosed up in a steep climb. Fig. 2 (in last month's issue, April) illustrates the advantage of the now center of gravity when gas models stall during a steep climb, as Mr. Durkee describes. Stalling of the wing probably has very little effect because the wing is contributing practically nothing to the climb, and whether or not it stalls is immaterial. The point is that the model noses-up so sharply that the force necessary to lift it at that climbing angle is greater than the

(*Turn to page 44*)

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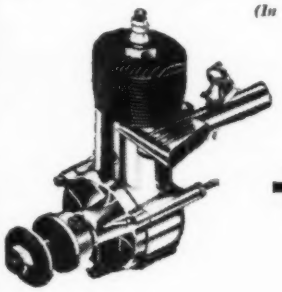

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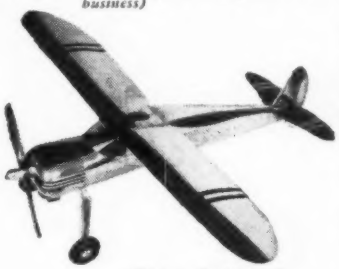

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*O&R 23 & 19 Fuel Tank	1.50
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*Pow-Or-Team Props	.45
*Pow-Or-Pitch Props	.35
Tornado Props	.50
*Baby Spitfire Prop	.25
"Infant" Power Prop	.20
*Spitfire Connector	.15
*Snap-or-Pack	.35
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*O&R Racer (Less Engine)	4.95
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*Doodle Bug .099	15.95
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thrust of the propeller at the climbing speed. Consequently, the pull of gravity being greater than the thrust, the model ceases to climb, loses its speed, loops, or performs some other maneuver. In this case it may be said, that the propeller stalls also, provided the blade angle is greater than 16° to the plane of rotation, because this angle-of-attack is approximately the stalling angle of an airfoil, such as the propeller blade. These stalls which are so common in contests, may be reduced: (1) by raising the thrust line, (2) by increasing the propeller blade area. This helps to reduce the sudden drop in propeller thrust. Instead, the thrust diminishes more gradually and causes the model to reduce its climbing speed gradually, thereby providing the tendency to nose back and downward into normal flight instead of stalling. Nine-tenths of the propellers used on motors at the present time have too little blade area. They churn the air and get no place. This is chiefly the result of the misconception that if a propeller turns 10,000 revolutions on the ground and develops a lot of thrust that it will provide an equal amount of thrust and be efficient during flight. This is probably the greatest and most prevalent error in model flying today. Best results are obtained with propellers that turn 10,000 rpm. or at a rate best suited to the engine *while the plane is moving forward in flight, not when it is stationary on the ground.* Most often propellers with proper blade area will not turn as high as 10,000 rpm when at rest on the ground; they may turn as little as 8,000. This is no indication of the lack of efficiency, however, because when they *move forward* in flight *they will turn 10,000 rpm.*

Don't forget to send your questions and comments to *"Design Forum,"* MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York 17, New York.

World War I

(*Continued from page* 19)

be fast enough to be useful; the top speed at sea level was 102 mph, 96.5 at 6,500′ and 94 at 10,000′. It was designed to fly and perform best at low altitudes, so its rate of climb was low: to 5,000′ in 11 min. and to 10,000′ in just under 30 min. Ceiling of the R. E. 8 was about 13,500′.

All this was done at a gross weight of 2,869 lbs., and with a 150 hp R. A. F. 4A engine. Empty, the R. E. 8 weighed in at 1,803 lbs., which gave a substantial useful load.

Some of the bad name acquired by the R. E. 8 was the result of unfortunate experiences with a few early models. The overhang of the upper wing on a few ships collapsed during violent acrobatics encountered in R. E. 8 service schools, but this weakness was eliminated immediately in subsequent production models. The ship definitely was inclined to be nose-heavy in all power applications, and the nose whipped violently downward in a stall. And lastly, the R. E. 8 was supposed to spin at the slightest excuse, and once in a spin, it was said never to come out.

That's what early R. E. 8 pilots claimed, and somehow the ship never seemed able to entirely live these rumors down. But as pilots got to know it better, and more ships got into service, most of the rumors proved unfounded.

Perhaps the best testimonial to an airplane's excellence is the quantity produced. No less than 4,077 R. E. 8's were produced for the Royal Air Force (and Royal Flying Corps) during World War I, and the airplane remained in service in large numbers right up to November 11, 1918. It was standard equipment in 21 British Squadrons, and you can rest assured that in time of war a nation uses the best types available for specific purposes.

R. E. 8 Design

It has been mentioned that the original R. E. family was an offshoot of the B. E. family. Early R. E. types were equal span biplanes with gracefully rounded wingtips. The R. E. 8, however, was an unequal span biplane with square tips. The former was utilized to give better load distribution and better visibility for the crew, while the latter element was a matter of simplifying production.

Span of the upper wing on the R. E. 8 was 42′ 8″, while lower wingspan was 32′ 7½″. Chord of each wing was 5′ 6″. The upper wing was staggered positively 2′ 0″, and both wings were set at 4° positive incidence. Both wings were set at 7° dihedral, and the over-all height of the airplane in flying position was 11′ 4½″.

Over-all length of the R. E. 8 was 27′ 10½″.

At rest on the ground, the R. E. 8 fuselage gave the appearance of bending in the middle. This illusion was created by the straight top line of the fuselage, combined with its upswept bottom line fore and aft, the heavily dihedraled and staggered wings, and the huge air scoop over the engine.

The air scoop was a necessary feature of the R. A. F. 4A engine fitted in the nose of the ship. The engine was a twelve-cylinder affair, vee-type and air-cooled. It was very similar to the French Renault air-cooled types, and was a product of the Royal Aircraft Factory as was the airplane.

Landing gear was conventional in appearance, with a full floating axle mounted by rubber shock cords. The tail skid was of the compression spring type and was steerable in some models.

Empennage of the R. E. 8 was conventional, consisting of fixed vertical and horizontal stabilizing surfaces to which were attached unbalanced rudder and elevators. A small vertical fin was fitted on the underside of the fuselage just ahead of the tail skid. This fin had two forms, one triangular and one elongated, the latter being larger in area. The reasons for this variation are unknown but it can be assumed that where the larger one was used, there was a need for additional directional stability.

Old Faithful "Harry Tate"

To those who got to know the R. E. 8 well, its virtues far outweighed its faults. It was affectionately called "Harry Tate" and gained the reputation of bringing home its crews faithfully although irreparably damaged as the result of enemy fire.

Even in death, the R. E. 8 tried hard to discharge its duties. For instance, on December 17, 1917, an R. E. 8 flown by Lt. Sandy with Sgt. Hughes as observer, was jumped by six Albatross D. V.'s. The unequal fight continued for several minutes until two more R. E. 8's arrived and drove off the Germans. Lt. Sandy's machine appeared to be all right, so the rescuing R. E. 8's withdrew.

Sandy and Hughes did not return to their field that night, and two days later their bodies were found in a cracked up R. E. 8 near St. Pol, 50 mi. distance from the scene of the battle. An autopsy revealed that a single armor-piercing bullet had killed both men, and the conclusion was that the plane —with its dead crew—had circled aimlessly for hours until its fuel was exhausted, then cracked up on its last landing.

Part 2 of the R. E. 8 story will include a structural analysis and additional evidence of its worth as a military aircraft.

Air Ways

(*Continued from page* 25)

operate in a given locality at one time. It will be impossible to shift frequency to avoid interference, as is possible to a certain extent on 50 mc.

5. You will legally be able to build your own receivers, but not transmitters. In fact, the transmitter cannot be tampered with in any manner whatever, even to replace a defective tube. The only operation you can perform is to change batteries.

Of course, the only reason for interest in the Citizens Band at all, at least among radio control enthusiasts, is that no license examination or code test will be needed to legally operate in it. However, since no approved equipment is available nor is there likely to be for some months, we urge potential R. C. enthusiasts to study up and obtain an amateur license so that

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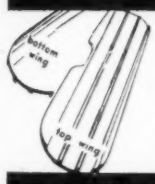

Wings with correct air foil, leading and trailing edges, spars and top planking built in. This wing is cut to shape, not bent.

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they can legally operate any of the very satisfactory radio control equipment now on sale. The license exams are not as tough as many seem to think; excellent books on the subject may be had at nominal cost from the American Radio Relay League, West Hartford, Connecticut, or from Editors and Engineers, Ltd., 1313 Kenwood Road, Santa Barbara, California. These books are also available at radio stores all over the country.

Before we close, there are two other possibilities that *may* open up in the *indefinite* future; notice that we stress "may" and "indefinite." The FCC is considering several additions to the amateur license classifications—these are tentatively labeled the Novice and the Technician license classes. The former will be good for one year only and will be non-renewable. A Novice will be restricted to specific amateur bands; 50 mc. is not one of them, though the 144 mc. band is. Technician licensees will be restricted to operation *above* 220 mc., and will have to pass a comprehensive theory test.

The interesting point about both of these proposals is that the code speed requirements have been set at only 5 words per minute. Here again, however, the proposals are *tentative*. The present plan calls for putting the new proposals into effect on January 1, 1951. This is a long time off, so again we urge—get busy and pass the amateur exams. Then you will be able to operate legally, you can enter R. C. meets of which there will be more and more this year, and you won't have to sneak furtively out of sight every time a big black sedan, which *could* contain FCC inspectors, approaches your flying site.

You may be sure that radio control enthusiasts, this magazine, the AMA, and other interested parties are doing all that is possible to clarify the R. C. license tangle. We note with considerable envy that Great Britain, and quite a few other countries as well, have *genuine license-free bands* for R. C. experimenters, where home-built transmitters can be operated without approval or any other rigmarole. These countries are definitely interested in developing knowledge and understanding of this fascinating and important field. It seems a very dim hope that the U. S. A. will offer us similar facilities; still, it will do no harm for us to write to the FCC and to our Congressmen urging such action. If every modeler interested in radio control were to do this, the Commission and our representatives in Washington would soon learn of the vast interest there is in the subject. Write them *now*! Then, after you write, start studying on your code and theory, so you can get into active R. C. work soon, without having to wait for the various vague future possibilities we have discussed to materialize.

Incidentally, we still have copies of our list of all the radio control articles that have appeared in past issues of MODEL AIRPLANE NEWS. These articles constitute an invaluable study course of the R. C. field, and the list details briefly the contents of each article. Copies of the list may be obtained gratis from our Editorial Office at 551 Fifth Avenue, New York 17, New York.

THE NATIONALS, a movie produced at Olathe in 1949, has been released by Pan American World Airways, sponsors of the PAA-Load event. An 18-minute film, in 16 mm. full color and sound, this film is ideal for showing at model club meetings, and also to groups who are not too familiar with model aviation. Virtually every form of model activity is depicted, including gliders, rubber-powered jobs, CO2, jet, speed, stunt, R. O. W., and R. O. G. gas, and the PAA-Load contest.

This picture may be booked for showing by an interested group through any Pan American District Sales Office and through the 25 offices of Ideal Pictures. AMA Headquarters and the U. S. Navy Public Relations Office, both in Washington can also supply copies, as can the Educational Director, Pan-American World Airways, 28-19 Bridge Plaza North, Long Island City 1, New York. Here is a chance no club group should miss—be sure to take advantage of it.

Our first picture shows Lawrence Conover (1020 Kirkwood Ct., Iowa City, Iowa) launching an indoor model of a type which his club, the *Iowa City Gas Hawks*, have been using for indoor contests this winter. The models were paper covered to assist those who were beginners in indoor building. Good times were made with them; some of the paper-covered jobs ran up times over 4-1/2 min.

Representing the glider enthusiasts, we see Mr. A. Dutson (West Middlesex, England) in Photo 2 with his F. A. I. glider which spans 8'6" and weighs 42 oz. The wing has an area of 8 sq. ft., and a parachute dethermalizer is housed in the fuselage. The towing hooks are equipped with an automatic rudder offset. These hooks hold the rudder in straight flight position during the tow, but the rudder springs over to provide circular flight when the tow ring is released. At one recent meet the model made several times over 6 min. Thanks to B. L. J. Neal (73 Eastmead Avenue, Greenford, Middlesex, England) for submitting this snapshot.

The *Tech Model Aircrafters* are a group that engage in indoor contests of various sorts during the winter months. One of their most popular contests was a scale event in which the rules specified that the models had to be built from kits costing no more than 50c. The Aeronca in picture 3 was flown by Lloyd Licher (Massachusetts Institute of Technology, Cambridge, Mass.) and turned in a time of 57 secs. under a 35' ceiling. Its endurance was limited due to the fact that the propeller was of too low a pitch and the model climbed too fast: maximum turns could not be utilized because the model consistently hit the roof.

Picture 4 shows an *O.K. CO2* engine which Roy L. Clough, Jr., (Box 208, Bristol, New Hampshire) has converted to operate as a diesel. The cylinder has been cut down and a brass plug is used to seal it at a fixed compression of about 12-1. The original exhaust ports are used as by-pass inlets by means of an aluminum sleeve and milled crankcase slots similar to the *Baby Spitfire* arrangement. New exhaust ports were drilled above the first fin. It was necessary to make a new piston and this is rouge-lapped to a very close fit. A sleeve rotary valve rear section was added to the engine. This is attached by 2-56 studs to the original motor mount lugs and a single stud mounting is machined integral with it. The carburetor was borrowed from an .035 *Precision Diesel*. Although the conversion has run fairly well on the bench on a number of occasions, Mr. Clough does not recommend the re-work because the large crankcase volume makes for low induction and transfer pressures. The motor is extremely critical on the needle valve adjustment. The best results were obtained with ether-castor and ether-mineral oil mixtures containing a fairly high percentage of turpentine. The *Hillcrest* plastic propeller proved excellent for test purposes because of the pitch-changing feature.

Photograph 5 illustrates a scale model made for the purpose of securing a patent on the *Airmobile*, developed by Rene Charette (213 Besserer Street, Ottawa, Ontario, Canada). This new design has also been proven by several flying scale models and the characteristics have been found very satisfactory. It will be noted in the photograph that the wings are folded, in which position the airplane can be operated as a roadable vehicle. Many unusual features, including an automatic flap control, are said to give the *Airmobile* quite a few of the characteristics of the helicopter. The big ship is designed to carry two persons in a side-by-side arrangement, and is rather small. The wingspan is only 21', while the over-all length is less than 20'.

Bernard Olney (145 Woodgrove Road, Burnley, Lancaster, England) writes that the controline sport model seen in picture 6 is a type that is very popular now in that country. This model, called the *Marlin Mite*, is powered by an *E. D. Bee* diesel engine of 1 cc. capacity. The span is 26", the weight 7 oz., and the model has a speed of 55-60 mph. This is quite an attractive little model, and we feel that the sideways

mounting of the engine improves the appearance very much.

For the World War I fans, illustration No. 7 shows Ed Maloney's (1215 Hillcrest Drive, Pomona, California) Nieuport 17, built to a scale of 3/4" = 1'. As may be seen, this model is very completely detailed and is finished to represent the ship the famous Billy Bishop flew.

An unusual scale model of the Consolidated Vultee XF-92A appears in No. 8. The big plane of course is jet-propelled, but the model which is about 30" long and has a 24" span, is powered by an *Ohlsson 29* engine, mounted as a pusher in the tail. Mr. Don Caminsky (2371 Edgewater Terrace, Los Angeles 39, California) says that the model is quite fast and very sensitive on the controls.

In our ninth photograph we see a *Dyna-Jet* powered speedster which has flown at 128.3 mph. for Andrew Jamrisko (6320 Marcus Street, Detroit 13, Michigan). Wooden construction has been used throughout, with a solid wing carved to the proper airfoil shape.

The increasingly popular team racers have taken the boys in Washington State by storm! We present in picture 10 two of these racers designed and built by Ray Welch (1802 Stadium Commons, Pullman, Washington) and by E. F. Witt (Tacoma). Both planes are finished in white with gold trim and black lettering. They are powered by *Ohlsson 29* engines, have 1 oz. fuel tanks, are fitted with fuel shut-offs, and are built strictly according to F. A. S. T. rules. The models weigh about 23 oz. each, and when first flown they clocked within .3 mph. of each other. The team fliers in the Tacoma area are divided into two schools of thought; one group favoring high speed engines, whereas the other group likes engines of more modest power output, but lower fuel consumption to lower the number of pit stops. Mr. Welch tells us that a new club, called the *Cloud Clippers* has been formed at Fort Lewis with quite a bit of activity and many promising junior fliers. Mr. Witt, who built one of the models photographed, is the club adviser.

Photo No. 11 shows a model popular in New Zealand. This is the *New Ruler*, which is in this case powered with an *Acme* engine. Gordon E. Codding (no street address) relates that one of his friends sent him this photo and paid $40 for the engine. It has a displacement of .564 cu. in. and swings a 15" high pitch propeller 11,000 rpm. While the price may seem high, the engine comes with a 12-year guarantee!

Our last illustration presents a very attractive modified *Forty Niner*, built from plans featured in the April '49 issue of M. A. N., by Howard Pavlick (119 Parker Avenue, Passaic, New Jersey). The original plans were altered slightly so that the tube would fit the *Baby Spitfire* engine. Howard states that this was his first attempt at controline model flying and he personally feels it has a distinct edge over free flight. The little airplane turned out to be a bit heavy but has been clocked over 50 mph. The fine photograph is credited to Howard's brother, Hal.

NEWS OF MODELERS

PEN-PAL SEEKERS: John Hall, Four Cannon Street North, Walsall, Staffs, England, prefers controline flying to all others . . . Tere Hensen, Kirkesbredet 4, Flekkefjord, Norway, is 16 and wishes to write to someone of about his own age who is interested in every kind of flying . . . Bryon Burr, 2A Dickson Street, Giaborne, North Island, New Zealand, 19 years old finds free flight gassies and U-control ships the most fascinating . . . Stanley Green, 16 Irwell Estate, Rotherkithe, London, S. E. 16, England, age 21, would like to correspond with a pen-pal who is interested in free flight and speed controline flying . . . T. Parrish, Waverley Road, Taringa, Brisbane, Queensland, Australia . . . William Sayers, 150 Pakington Street, Yulong West, Victoria, Australia, age—22, likes everything to do with model airplanes . . . J. A. Johnston, Manuherikia Road, Alexandra, Central Otago, New Zealand, enjoys free flight gas models . . . H. Greenhalgh, 14 Sefton Road, Charlton-on-Hardy, Manchester 21, Lancashire, England.

SPECIAL REQUESTS: C. P. G. Wheldon, 59 Carter Lane, Quinton, Birmingham 32, England, has a brand-new *Jetex 200* outfit with 50 extra fuel charges and wicks that he would like to exchange for a new K & B *Infant* with two spare plugs . . . Maurice Franklin, 98 Grasmere Street, Leicester, England, sincerely offers to send the equivalent of a *Roger's 29*, *Class B*, in English merchandise.

CLUB NEWS

California

We learn several news items from the publication WEST COAST MODEL NEWS.

M/Sgt. Clair L. Bussard, USMC, prominent member of the *San Francisco Mustangs*, and secretary of the *Western Associated Modelers* for the past year has been transferred to the Marine Base at Camp Pendleton, Oceanside, California. Northern California's loss no doubt will be Southern California's gain in getting this "tops" in modelers on the West Coast. While serving as secretary of the *W. A. M.*, it was his job to take care of all the publicity. His vacations were spent at flight circles in Oregon and Washington, always giving a helping hand to the modelers.

Over 150 members, representing 18 clubs, and 9 guests attended the First Annual Banquet of the *Western Associated Modelers*. Mark Brown, of the *Stockton Gas Model Association*, was credited as the top man in the speed events, and Eugene Stiles, of the *Alameda Aero Modelers*, as the top precision flier. These two clubs by the way were awarded the Association Plaques by Mr. Howard Puckett for winning the most events during the past season. "Pop" Robbers reviewed the growth of the *W. A. M.* An amusing incident occurred during the Banquet. Chairman Jack Stanton's name was drawn for the door prize just after he had commented on how nice the prize—a beautiful airplane figured ash tray—would fit in his home; he refused to accept and the second drawing awarded the prize to R. H. Vetter. Roy Mayes discussed the "Present Status of the Association," emphasizing the cooperation, sportsmanship, good fellowship, and willingness of the members to make the *Western Associated Modelers* the very successful organization that it is today.

Acting secretary Al Waltz, on behalf of Clair Bussard, asked for a show of appreciation for the fine job Clair had done which was spontaneously given in loud applause. Elected officers for the coming year are: President—Jalmer Swenson, *Alameda Aero Modelers;* Vice President—Jerome J. Guggemos, *Richmond Modelaire Imagineers;* and Secretary and Treasurer—Harvey "Pop" Robbers, Sr., *Oakland Sky Rogues.*

Illinois

John L. Alleman, of the *La Salle-Peru Turf Tearers*, is eager to clear up the story that they are connected with the *La Salle Modelers*, as the latter group has been discontinued for several years. The *Turf Tearers* are interested in both control flight

and free flight. Although they have been getting together since September, 1949, their first official meeting is scheduled to be held sometime in March and a membership of 35 is anticipated. To create more enthusiasm, several of the older members are using controline trainer models to teach the younger boys how to fly. They feel this is a good idea as it saves some of the younger modelers from cracking up their first airplanes and possibly losing interest in model building.

New Jersey

Through the courtesy of the *Millville Air Works Club*, the *Garden State Aeronants*, one of the most active groups of modelers in South Jersey, have access to the *Millville* club rooms every first and third Tuesday of each month for their meetings. Andrew Canino promises to give us more information about the *Aeronants* in the future.

The *Ridgewood Sky Hawks* held another in their popular series of beauty contests on February 25. Sponsored by the *Ridgewood Exchange Club*, the contest covered both flying and non-flying models. The top winners in the *Flying* category were: *Open* —Jack Franke; *Sr.*—Harold Price: *Jr.*—Charles Heyde. *Non-flying Open*—George Lamb: *Sr.*—Henry Faasse; *Jr.*—T. E. Johnson. A *Girls'* division was added this year and Becky Bathman won both *Flying* and *Non-flying* top honors. Jack Franke's *Open Flying* class winner was awarded a special prize for the Best Ship in the meet.

New York

Art Wardell, secretary of the *Supersonic Aero Club*, of Queens, writes that everyone has been very busy since the club was organized over a year ago and it is only now that he has found a chance to tell us about its progress. They have 28 members; a few once belonged to the old *Plane Nuts*, which is no longer in existence. Art comments that the club's only complaint is that New York winters are not the best and they did not spend much time on the field, but succeeded in testing their new metal ships. The entire fuselage (top and bottom) is cast magnesium and they use either bass wood or aluminum wings. At present, they have several ships in each B, C, and D classes—which are all lighter than equivalent designs of pine. Once a month a film on modeling is shown, and has helped a great deal toward preventing the expected lack of interest during the winter season.

Secretary Cliff Wickman, of the *Rochester Model Aircraft Association*, writes that the *RMAA* is now an AMA chartered club. They have meetings twice a month with an average of 35 members attending. Cliff will gladly give more information about the goings-on of the club: his address is 780 Hudson Avenue, Rochester 21, New York.

We quote from a recent letter:

"The *Prop Spinners* club, long renowned in the northeastern area, is re-organizing around a nucleus of old members, including such notables as Warren Fletcher, Bob Hatschek, and others. The club is interested in all modelers of the metropolitan area who either are active participants in any phase of contest flying, or would like to become active.

"Also worth mentioning is the contest record of the *Prop Spinners* themselves. They were simultaneous holders of 13 National records and winners of more meets than can be tabulated. The most important of these were first at the Nationals and top U. S. honors in last year's Wakefield finals in England.

"Anyone over 14 years old who is interested in affiliating himself with the most active club East of California, should send his name and address to William Fletcher, secretary, at 87-08 Grand Avenue, Elmhurst, New York."

North Carolina

E. D. Aldridge, secretary and treasurer of the *Skywriters Model Airplane Club*, announces that a ½A (under .050) Free Flight North Carolina State-Wide Contest is scheduled to take place Sunday, May 14, at the Count Farm in Winston-Salem.

Ohio

We have heard from Jack Volar, secretary of the *Medina Model Club*, that the club is steadily growing larger. Three new members have been added and five more are joining. Jack also said that the club is negotiating a lease of a 15-acre field for the club to use as a flying field. Thanks to the *Rubber City Aeronauts*, of Akron, monthly bulletin PROP WASH, for this information.

Pennsylvania

A restricted Controline Speed and Stunt Contest is scheduled to be held May 21 on the model airport on Route 13 in Bristol. Only Pennsylvania residents of Bucks, Philadelphia, Montgomery, and Delaware counties will be admitted. Clarence Wells, secretary of the *Bristol Aeromodeleers*, also tells us that a special feature Team Racing will be included in the contest.

South Carolina

The Second Annual Greenville Model Meet will be held in two parts. The free flight portion will be held on Sunday, May 14, and U-control is to take place on Sunday, May 21. All AMA events are scheduled. Contestants should write the contest director, J. W. Scharpf, Jr., at 110 Paris View Drive, Greenville, or telephone Greenville 3-4715.

Texas

The Leonard's Department Store has elected to sponsor the *Fort Worth Aero Modelers* at the 1950 Nationals—so far a definite plan has not been worked out. The Club Charter finally arrived from AMA Headquarters and it has been determined that there are enough members belonging to the AMA to make the club acceptable. Send a penny post card with your name and address to Bill De Lorme, 4100 Pershing, Fort Worth, Texas, and he will put you on the list to receive 26 issues a year—all free—of the *Aero Modelers'* NEWSLETTER. Dubb McCormick won the ½A event and Herbert Watson won the Open event at the monthly contest held in February.

Wisconsin

An invitation is extended to any out-of-town modeler who happens to be near the American Legion Hall in Marshfield on a Wednesday evening to attend the weekly meeting of the members of the *Line Busters*. The club is divided into two groups—stunt and speed. Information is available from Dale Sherman, 161 South Central, Marshfield, Wisconsin.

On April 23 and May 21 the *Milwaukee Aero Modelers* are sponsoring controline record trials, rain dates being the following Sundays in each case. All events will be AMA sanctioned. The flying site is going to be the Soldiers Home Recreation Area, and since it is quite large, all free flight modelers are invited to bring their

(*Turn to page 52*)

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The Nationals will have the PAA Load Event—also many important regional meets. It is sponsored by Pan American as a challenge to *you* to build model planes of more realistic character and to fly them in a more practical demonstration of true aviation value than ever before possible in competition.

See summary of rules at right and write for PAA Load Event booklet. (Official rules as approved by Academy of Aeronautics and published in booklet form by PAA will answer any questions you may have.)

Write to Educational Director, 28-19 Bridge Plaza North, Long Island City 1, New York.

Summary of 1950 Rules and Specifications for PAA Load Event

Eligibility: AMA requirements apply and categories are: Combined Junior-Senior (Classes III and II); Open (Class I).

Rules: Official Model Aircraft Regulations for "Gas Models—Free Flight" apply except as noted below:

Classification—R.O.G. only, Classes "A" and "B" only.

Power Loading Requirement—Rule applies without payload.

Payload—The Models shall carry in flight dummy occupants as follows:

a. One occupant for Class "A".
b. Two occupants for Class "B".

Dummy occupants shall be composed of a "body" at least 3 x 3 x 1 inches surmounted by a head at least 1 x 1 x 1 inches, made of any materials with each occupant weighing at least eight ounces. Except for balance purpose, the occupants shall not be essential to the operation of the model. Contestants must provide their own occupants.

Payload Compartment, the occupants must be carried in an upright position relative to normal flight, facing forward. The "face" is considered to be on the broad side of the occupant. Dummy to be placed within an enclosed compartment providing visibility through transparent areas at least one inch high to the front end to both sides of the heads of the occupants. The occupant must be readily removable from the compartment for checking of weight and measurements.

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model airplanes and give the spin-dizzy boys some competition. Anyone requesting information about these trials or the club should contact Victor Weisbrodt, 2567 North Cramer Street, Milwaukee, or Bob Abresch, 3066 North Humboldt Boulevard, Milwaukee, Wisconsin.

Denmark

Per Weishaupt, of the *Dansk Modelflyver Union*, tells us that the most important result of Danish model flying during 1949 was the victory in the classic Nordic Glider Contest, which took place last July in Helsinki, Finland. It was the first time Denmark has won this team contest. There are 818 members in 51 clubs affiliated with the *Dansk Modelflyver Union*. However, the *Union* is going to be dissolved and the model clubs affiliated with the *Royal Danish Aeroclub* plan to establish a model department under the chairmanship of Johannes Thinesen.

Curtiss Swift

(*Continued from page 12*)

dope, sanding between coats. Paint the wing and tail surfaces chrome yellow and the fuselage olive drab or black. Next come the insignias, which truly set this model off from the rest on the field.

Army rudder striping may be applied best by masking with suitable tape. The horizontal red and white stripes are set off from the yellow fin with a blue vertical bar. The wing insignias, on the other hand, are painted differently. First, paint a circular blue field. On top of this paint a white star and finally a red dot in the center of the star. A perfect circular insignia may be made by first dipping a draftsman's inking compass in the proper colored dope and laying a thin circle of dope of the correct diameter in the desired space. The center of the circle may easily be filled-in by brush. Stars are easily made by proper masking. The wing insignias on the "Swift" look good if they are 6" in diameter. "U.S. ARMY" lettered in black on the underside of the wing adds much realism. Remember to hot-fuelproof the entire ship if glow plug ignition is to be used.

When building and flying the *Swift*, be sure to exercise rules that would be applied to any U-control model. If a good "29" engine is used, fly the *Swift* on 60 to 70' of .010" solid wire or .012" cable. Be careful on tight consecutive maneuvers to avoid your propwash or severe buffeting will be encountered. This is due to the large wing and is experienced on calm days only. You will find the *Swift* virtually a flawless airplane, so good luck, and good flying!

DeHavilland Chipmunk

(*Continued from page 21*)

DeHavilland Aircraft of Canada, Ltd. was formed in 1928 to act as a servicing and supply agency for DeHavilland airplanes in Canada; but in 1937 D.H.C. began the manufacture of complete airplanes. The airplane selected was, of course, the D.H. *Tiger Moth* trainer for the Royal Canadian Air Force, then building up its strength for the coming test of World War II. Production of the *Tiger Moth* continued until 1942, when it switched to the famed DeHavilland *Mosquito*.

Towards the end of World War II the D.H.C. design staff sought and obtained permission from the parent company in England to undertake original design work and its first project was the DHC-1 *Chipmunk* trainer, which began on the drawing boards in October, 1945. The trim little ship took to the air for the first time May 22, 1946, under the capable hands of test pilot W. P. I. Fillingham—a remarkable feat of designing and building an airplane in just six months! Small-quantity production began for the R.C.A.F. in the D.H.C. plant near Toronto, Ontario. At this time, as previously mentioned, the Royal Air Force was following its policy of developing high-performance three-seat turboprop trainers and the parent DeHavilland com-

pany in England regarded the little *Chipmunk* as something of an inexpensive lark on the part of its Canadian subsidiary.

But suddenly things began to happen! Test flights and appraisal of the little *Chipmunk* by a growing number of R.C.A.F. and R.A.F. officers, as well as those of other countries, revealed a truly remarkable little airplane. At the same time, the R.A.F. (and the U.S.A.F.) were considerably revising their concept of the importance of primary training in light airplanes. The Belgian Air Force ordered a quantity production lot of *Chipmunks* and the Royal Air Force Volunteer Reserve began to express great interest in the plane. This sudden turn of events completely reversed the thinking of the DeHavilland home office and they suddenly decided that the Canadian group might really have something. A sample *Chipmunk* was delivered to England and hundreds of R.A.F. and civilian pilots swarmed to take a test hop in it. Finally, the R.A.F.V.R. selected the plane as its standard trainer and the home office made its decision: they picked up the *Chipmunk* bag and baggage and moved it to England, where its production, development and sales are now handled exclusively! But the little Canadian band took this on the chin and went right ahead developing another Canadian airplane, the DHC-2 *Beaver* cabin monoplane, now in production. (But we'll bet they hope its success doesn't get *too* big, or the home office will steal it!)

The *Chipmunk* is simplicity itself, but aircraft designers long ago have learned that simplicity is the first fundamental of aircraft design. Two-seat tandem, low-wing monoplane in design, the *Chipmunk* features fixed landing gear, all-metal construction, and landing flaps. The wing section is an NACA 2415 at the root blending smoothly into a U.S.A. 35B at the tips, the latter having a high camber for high angle-of-attack at the stall. As a result the *Chipmunk* has good stall characteristics which are gentle but positive and recovery is made the instant the stick is pushed forward, there being no need to use the rudder in the full opposite direction, as is recommended for spin-recovery of most airplanes. The wing has a single spar with pressed-flange ribs and a formed D-section leading edge. The leading edge is a metal skin but the wing is fabric covered aft of the spar. The flaps are simple hinged surfaces, fabric-covered and have a fixed trim tab on the port surface. Only about one-half flap is ever required for normal operation of the *Chipmunk* and full-flap is used only to stimulate high-powered combat aircraft approaches. The trim little trainer lands at only 50 mph. flaps up, which is slow enough for most purposes. Thirty-degrees of flap reduce this to 43 mph.

The fuselage is built up on vertical frames, longitudinal extruded stringers and aluminum alloy skin plating. A fairly heavy main frame is used, the upper portion comprises the pilot's windshield and turn-over protection and the bottom portion carries the fittings for the wing attachment. The wing is attached at three points: upper and lower flanges of the spar and at the leading edge. The stabilizer is attached to fuselage fittings at its front spar, but its rear spar is supported by two struts extending from the bottom of the aft bulkhead rearwards, then upwards to the stabilizer rear spar. These struts are adjustable to provide the balance requirements of the airplane. The fin and stabilizer are of all-metal structure; the rudder and elevators are metal structure fabric-covered. The rudder has a fixed trim tab on its trailing edge near the bottom but the elevator has large adjustable trim tabs on the trailing edge. The tail cone contains space for balancing weights when required.

The two seats are pressed metal and illustrate the possibility of simplicity in cockpit arrangement with the elevator trim tab wheels mounted on the left part of the seat at the front. Both instrument panels contain airspeed indicator, turn-and-bank indicator, tachometer, altimeter, oil pressure gauge and a vertical reading compass. The front seat panel also contains an oil temperature gauge. The fuel quantity gauge

is located out in the wing panels, each wing tank containing 15 gallons, or a total of 30, for the airplane. The brake handle is on the left side of each cockpit near the floor. Throttle and mixture controls are in their usual place on the left along the upper rail. Magneto switches in the front cockpit are located on the lower right side of the instrument panel but in the rear cockpit are mounted on top the instrument panel on the left, accessible to both cockpits. Fuselage width is 30" and the distance from the top of the comfortably-high canopy is 54".

Power plant is the De Havilland *Gipsy Major* 1C, which develops 140 hp at 2,500 rpm. This amazing engine has an official overhaul time of 1,500 hours between overhaul (compared to less than 1,000 hours in most other engines). It is supported on rubber bushings in a welded steel tubing engine mount projecting forward from the firewall fittings. The carburetor air intake is located along the lower engine cowling, which hinges along the upper centerline as in prewar automobiles. The oil tank has a capacity of 3-1/4 gallons and is mounted in the lower rear engine compartment. Either a fixed-pitch wooden propeller, or a Fairey-Reed metal propeller, can be used, the latter giving slightly improved performance.

The fixed landing gear uses rubber compression legs, consisting of a series of rubber "doughnuts" mounted around the strut, in contrast to the hydraulic oleo strut used in even the simplest U.S. lightplanes. However, the *Chipmunk* is equipped with regular hydraulic brakes operating from a master cylinder on the fuselage floor.

The DHC-1 *Chipmunk* has a span of 34′ 4" and is 25′ 8" long. It stands 7′ 1" high. The wing area is 172.5 sq. ft., incidence is 2° and the dihedral is 5°. The aspect ratio is 6.82 and taper ratio is 2.1:1, giving the wing a lean, slim look.

The *Chipmunk* weighs only 1,175 lbs. empty and a mere 1,780 lbs. fully loaded! These low weights give it a wing loading of only 10.3 lbs. /sq. ft. and a power loading of 14.3 lbs. /hp.

It has a top speed of 141 mph at sea level and cruises at 124 mph. Its initial rate-of-climb is 900 ft. /min., it has a service ceiling of 19,000′ and can reach 21,200′ absolute! It has a still-air range of 500 miles and obtains about 24 air miles to the gallon of fuel, or better than most automobiles.

The little *Chipmunk* is in quantity production for the R.A.F.V.R. and various small lots are being furnished other Dominion Air Forces and a variety of foreign countries as well. Several have been sold as private airplanes. An excellent all-round primary training airplane, the *Chipmunk* not only caused the Royal Air Force to take another look at its plans for training future fighters and bomber pilots but caused its parent company in England to whisk this upstart airplane from its outlying subsidiary in Canada right back to the home office for production and development. Assuredly the *Chipmunk* has gone a long way from its meager beginning and proves that the "lowly" trainer, properly designed, can cause major policy decisions in high places: even a minor revolution!

Civy Hearse

(*Continued from page* 17)

will be needed. If builder uses hardwood beam mounts, pass them through slots in the firewall and cement in place 2" or 3" back into the fuselage cabin. The *Arden .199* may be mounted radially as the Arden design facilitates—by the use of only two machine screws. The nose moment of the *Hearse* was designed for use of the *O. & R. .19* engine which weighs 5½ oz. If an *Arden .19* is used—weighing 4¼ oz.—an ounce of clay may need to be added inside the firewall to hold the balance of the model in its indicated position, at the wing trailing edge.

The landing gear is made from 3/32" piano wire and installed by fastening to the front of the firewall with small metal landing gear brackets. Use any type light sponge rubber wheel 2 to 2½" in diameter.

Use medium celluloid for cabin windows. Install cabin windows, covering as many sections of the "greenhouse" area that the size celluloid available will permit, to insure neatness of cabin window area.

WING CONSTRUCTION. Note: on the plans the wing tip outlines are laminated, using medium 3/16" sheet for bottom or main lamination, with top lamination being ⅛" sheet.

Cut the tip outline pieces and cement in place. Cut out wing ribs while wing tip outlines are drying—cut center section ribs and dihedral break ribs from 3/32" medium sheet. All other ribs are cut from 1/16" sheet. The wing spar sizes are, in order, from leading edge to trailing edge: ⅛" x ⅜", ⅛" x ½", ⅛" x ⅜", ⅛" x ⅛". Wingtip spars begin a gradual taper from rib No. 5 to the tip. All dihedral breaks are made in the wing by laminating spars.

Assemble the wing after ribs are cut and notched, spars cut to length and tapered, and wingtip outlines are dry. Lay out complete outline of one wing, then slide ribs on to the spars one section at a time and cement into place. Do not cement the dihedral break ribs in place on the spars until the wing frame is dry. Block up wing to required dihedral (see plan), and cement the overlapping spars and the ⅛" dihedral break ribs. Shape the leading and trailing edge to conform to the airfoil, and the wing tip outlines to conform to the airfoil ribs. Add 3/16" sheet hard balsa gussets to leading and trailing edge dihedral breaks. Plank top and bottom center section of wing with 1/16" sheet as shown on plan. Sand the whole job thoroughly.

The stabilizer is very simple to construct. The stab outline is made from ¼" sheet. Cut the curved parts of the stabilizer to plan form. Plank bottom center section of stab over plan. Cut and cement lower cap strip ribs into place. Note: these spars begin a gradual taper from rib No. 5 to each tip. Also note: rib sections 1, 5, & 9 are filled in solid.

Cut top rudder pieces from soft 3/16" sheet. The sub-rudder is cut from hard 3/16" sheet with grain vertical; sand both rudders to an airfoil shape and cement into place on stabilizer.

COVERING. Japanese tissue is suggested for covering. Tissue not only gives a beautiful transparent finish, but is stronger than many modelers believe, when properly treated. I used 10 coats of medium thickness clear dope, adding 10% castor oil to the last two coats to prevent warps.

Little difficulty should be encountered when test flying the *Civy Hearse*, if the model is well-aligned. Operate engine on rich mixture for first several flights, striving for a nose-up spiral under power, with a fairly tight flat glide. Glide circles of 100 to 300′ diameter seem to be the best thermal snatchers.

Remember that the required downthrust for the engine is built into the firewall.

The *Hearse* will fly equally well either to the left or the right under power. My model flies to the right under power and glides right.

It is suggested that the ship be adjusted to circle in the glide the same direction as under power. This insures a smooth recovery at the top of the power run. Use of "wash-in" in the wing panel toward which the model circles under power is recommended.

We advise that the *Civy Hearse* be trimmed with less positive incidence for windy weather. In the author's opinion, this sort of adjustment applies to almost any model airplane free flight design. Place a small strip of 1/32" sheet balsa under the leading edge of the stab, thus decreasing over-all incidence to 1/16". If the builder does not desire to tamper with the incidence, try balancing the model about 1" forward from the trailing edge of the wing. This will enable the model to glide 2 to 3 mph faster; when flying in a gusty wind, this will tend to dampen the slight stall that any model may exhibit when it turns from the downwind leg into the wind.

The *Civy Hearse* is a fine little load carrier. Flown without the 8 oz. dummy occupant, the *Hearse* turns in flights approaching its counterpart, the *Civy Boy*.

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Flying Models and the Air Force

(*Continued from page* 23)

Despite the weight and wire drag on the model, she should really be capable of stepping out above the 200 mph mark.

Several other jet-powered designs have been flown. These include two models with the engines mounted internally in the fuselage. Construction is of metal and wood. Both models have vents near the intake of the engine for the admission of air. The fuselage of one ends shortly behind the wings and the jet engine's tailpipe is used as a boom to support the tail surfaces. Performance figures of these models have not been released as yet for publication.

Of the many prop-powered controline models utilized, a number resemble the stunt and speed models of the model enthusiast. They take off from a large three-wheeled dolly and land on a single wheel which is located behind a sturdy body skid. Powered by the same type of 3 hp engine used in the B-17 described, some have also approached the 200 mph mark in recent tests.

As stated, the Dynamic Model Unit began its research work with free flight models, the XFG-1 swept wing glider being one of the first miniature test guinea pigs to perform. Radio controlled "drone" target models were next tested and these were followed by a unique model helicopter which sports twin counter rotating dual blades from a single boom. No other information has been released by the Air Forces on the 'copter, outside of the fact that it has been flown successfully.

One of the most unique free flight models completed by the Dynamic Model Unit for radio controlled flight tests is an elaborate B-49 flying wing. It required over four months to build and is complete with flight instrumentation and radio equipment which operates on five different channels. The model has been put through a series of wind tunnel tests prior to its actual flight testing. When completed, it will be equipped with a 28' parachute which can be released by radio from the ground in the event of a mishap in flight. Parachute recovery was first tried in the aforementioned spin tests of the XFG-1 glider model. As the model twisted earthward, all attempts to bring her out of the spin by radio control proved fruitless. Finally, when close to the ground, a radio signal opened a trap door in the rudder of the glider releasing an anti-spin chute. This stopped the spin. A few seconds later another signal operated a trap door solenoid in the fuselage and another chute popped out to lower the model gently to earth.

The shop facilities where the models are "manufactured" are complete with lathes, jig saws, sanders, planers and a variety of model making tools and jigs which would cause the average model builder to water at the mouth. Mass production is planned for the future, with plastic molded control line and free flight models. The technique is being developed at present to produce a multitude of models for a free flight testing range which the Air Materiel Command expects to set up in a Western desert area. There, it is planned to jet propel some models beyond the speed of sound. Rockets will probably be used to attain such high, and heretofore unheard of, model speeds. At near sonic speeds anything can happen, hence the model would be considered expendible. Recovery by parachute would pose quite a difficult problem. For that reason, a number of cheap models which are easy to make and handle are most desirable. Mass production by molding out of plastics appears to be a good solution.

Officials of the Air Materiel Command claim that model builders throughout the world will benefit in many ways from the knowledge accrued in the fabrication of these models. Quoting from a recent news release, "The techniques, when revealed, will be a boon to model builders everywhere."

To study possible experimental flying circle layouts and procedures, a 1/20th scale replica of the immediate flying area has been set up on a 21-foot diameter wooden table. This time the flying circle is smaller than a model builder's circle (about ¼ the size) with a 10-foot flight radius. The layout was constructed as the result of recently conceived plans for creating violent updrafts of air around the course to study the effects of gusts upon the models in flight. The drafts will be exhausted through ducts 40' x 15' in cross section. Before the design is completed and construction is started on the larger flying area, the miniature mock-up will be equipped with its own small gust ducts. Models, smaller than a foot in wingspread, and propelled by compressed air, will then be flown around the miniature circle. It should be more fun than work to those who test and fly the midget controline miniatures.

Index to ADVERTISERS IN MAY 1950 ISSUE

No responsibility assumed for any omission or error.

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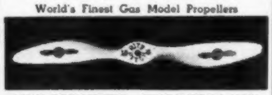

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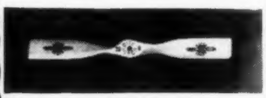

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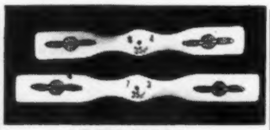

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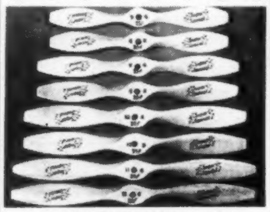

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